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How Important is a Regional Free Trade Area for Southern Africa?

Potential Impacts and Structural Constraints

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ABSTRACT

We develop a detailed trade analysis to assess the potential welfare impacts of a free trade agreement (FTA) on the agricultural sector of southern African countries and to determine opportunities and challenges faced by the region as a consequence of the agreement. Our approach combines an in-depth look at the current trading patterns of southern African countries with the application of a partial equilibrium analysis that uses bilateral trade data at the four-digit standard international trade classification (SITC) level for 193 agricultural industries in 14 southern African countries. Low diversification of agricultural exports in most southern African countries seems to be a major constraint for promoting regional trade. In most countries, overall welfare effects of an FTA would be positive but small. Inefficient agricultural producers with a regional comparative advantage for agriculture would benefit from trade creation with the rest of the world. Welfare results for regional importers would be negative because of increased imports from inefficient regional producers. These results suggest that the region should be looking at regional policies and interventions beyond trade arrangements, such as those targeting investment, agricultural productivity, and diversification, to enhance benefits of regional trade liberalization.

Key words: regional trade agreement, Southern Africa, agricultural trade

1. INTRODUCTION

The origins of regional integration within southern Africa can be traced back to the formation of the Southern African Customs Union (SACU) late in the nineteenth century. But in the past two decades, the region has witnessed a growing number of regional cooperation and integration initiatives. Agreements such as the Southern African Development Coordination Conference (SADCC) were largely focused on reducing dependence on first-world countries and apartheid South Africa. The Southern African Development Community (SADC), which superseded the SADCC, was formed in 1992 and currently consists of 14 member countries.[1] A new economic environment emerged within SADC with the adoption of the protocol on trade in 1996 and its implementation, which started in 2000. This protocol aims to establish a free trade area by 2008, with full liberalization of trade expected by 2012. According to the agreed tariff phasedown schedules, 85 percent of all product lines should be trading at zero tariffs by 2008. The remaining 15 percent, constituting sensitive products, will have tariff barriers removed between 2008 and 2012. The tariff phasedown is being done on a step-by-step basis, with each schedule taking effect every January since 2001. As of January 2008, the 85 percent target was deemed effective. For the SADC, the FTA is a step toward higher levels of economic integration. These levels are to be achieved on an incremental basis, leading to a customs union in 2010, a common market in 2015, and a monetary union in 2018 (SARDC 2008).

It should be noted that most of the SADC countries have undertaken substantial trade policy reforms since the mid-1980s, in line with market liberalization policies and regional integration initiatives. Before that, most of the countries, including South Africa, had adopted inward development strategies and interventionist/protectionist trade policies. In Namibia, for example, the government has privatized support services, such as tractor and seed provision, and agricultural boards no longer set prices or procure agricultural products. Tanzania, Zambia, and Malawi have liberalized their exchange rates, decontrolled pricing systems, and abolished price setting by agricultural boards. Quantitative restrictions, specific duties, import and export permits, surcharges, and other regulations have since been eliminated. Many of the major government parastatals, including crop and marketing boards, have been privatized, and other market reforms have been implemented. Most governments have reduced trade-restricting practices in both tariff and nontariff areas as part of comprehensive economic reform programs. Thus, the trend has been for governments to withdraw from direct involvement in agricultural production, marketing, and distribution activities.[2]

As a result of these policy changes, trade among SADC member countries has seen a significant expansion during the 1990s and early 2000s. Whereas total agricultural exports from the region expanded at a rate of 7.5 percent a year, exports from southern African countries to the region grew at a rate of 13 percent a year between 1990 and 1999, resulting in the region increasing its share as a destination for agricultural commodities from southern African countries from 7 percent in 1990 to 12 percent in 1999. More than 70 percent of this export expansion can be explained by increased exports from the SACU countries, with Mozambique, Zimbabwe, and Zambia together accounting for the remaining 30 percent. On the import side, SACU countries account for only 8 percent of growth. Mozambique, Zimbabwe, Zambia, and Angola account for almost 80 percent of the increase in imports.

[1] Member countries are Angola, Botswana, the Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe, representing a population of approximately 200 million people and covering an area of 9.2 million square kilometers. Angola and the DRC are currently not applying the trade protocol (SARDC 2008).

2 For references and a discussion of some of these policy changes, see Nin Pratt and Yu (2008).

Current trade policies envisage transforming the economies of the SADC countries to become more competitive through export-led growth. Countries aim to harmonize their trade policies in line with the SADC protocol on trade and other regional and international trade agreements. Regional and multilateral trade agreements have also thrown up new trade partners. The reforms that SADC member countries have implemented to improve trade regimes have been supported by the implementation of multilateral, regional, and bilateral trade agreements. The driving force behind the engagement of these countries in trade agreements has been for them to secure an improvement in market access for exports and to attain efficiency in sourcing imports (Economic and Social Research Foundation [ESRF] 2003).

Because most SADC economies are predominantly agriculture based and food dominates agricultural trade among SADC countries, enhanced trade in agricultural products potentially provides a tool for fighting poverty, promoting integration, and increasing economic growth and welfare in the region (ESRF 2003). SADC countries differ geographically, economically, and in their levels of development. For example, some countries such as Tanzania, Mozambique, the DRC, Angola, Namibia, and South Africa have ports, while others such as Malawi, Zambia, Zimbabwe, and Botswana are landlocked. Weather and climatic conditions are not uniform in the region, resulting in the production of different crops and differences in cropping patterns. These differences in crops and cropping patterns indicate the different levels of vulnerability of SADC countries to food crises. In addition, some countries like Namibia, Botswana, Zimbabwe, and Zambia are prone to persistent drought (ESRF 2003). Countries like Botswana and Namibia also have relatively limited arable land, with comparative advantages for livestock production and disadvantages for crop production. Tanzania and South Africa, on the other hand, are endowed with diverse weather conditions and abundant arable land, which allows them to farm a range of different crops. These two countries are also well positioned to facilitate trade (e.g., they have borders with many other countries and seaports). Countries such as Malawi, Zimbabwe, and Zambia also have good climatic conditions for food production. These differences could determine and indicate potential for trade in agriculture and food products in the region.

How could an FTA in southern Africa affect regional trade in the region—in particular, trade in agricultural products? Would SADC members benefit from regional trade liberalization? Which countries would gain from such policy changes? Which agricultural subsectors have the potential to increase production and expand regional trade in an FTA? Several studies in the past looked at the impact of an FTA in southern Africa and tried to answer some of these questions. Although a number of those studies showed that trade creation dominates trade diversion and that there are economic benefits to be realized from an FTA, others repeatedly indicated limitations in southern Africa's economies that reduce the potential gains from an FTA.

Diao and Robinson (2003) showed that the elimination of agricultural tariffs among SADC countries would benefit real agricultural gross domestic product (GDP), national income, and agricultural output in the region. Studies by Lewis (2001) and Lewis, Robinson, and Thierfelder (2002) used computable general equilibrium (CGE) modeling to examine the impact of an FTA on SADC economies. The authors concluded that the gains that can be achieved through trade expansion are limited given SADC's small size relative to the global economy and the trade imbalances among its members. In a similar vein, Holden (1996) observed that South Africa has little incentive to seek preferential treatment in the region, largely because of the economic divergence between it and other nearby countries[3] and because South Africa's share of regional exports remains small relative to its exports to the rest of the world.[4] Various studies using a gravity

[3] For example, in the 1980s, average growth rates in real GDP ranged from 10% in Botswana to –0.4% in Mozambique, whereas between 1991 and 1999, growth rates ranged from 6.4% in Mozambique to –5.9% in the DRC (Chauvin and Gaulier 2002). Also, for Jenkins, Leape, and Thomas 2000 evidence indicates that the SADC region showed a pattern of divergence among its members (with the exception of SACU) over the course of 30 years (1960–1990).

[4] For 2000–2005, South Africa's agricultural exports to the region were, on average, 20 percent of its total exports.

model (Cassim 2000; Longo and Sekkat 2001; Subramanian and Tamirisa 2001) have also shown that the implementation of an FTA in SADC would have favorable effects on bilateral trade.

The heterogeneity in economic structures is cause for concern, as empirical evidence shows that, in general, countries with relatively similar levels of economic development have the most success in integrating (the European Union is an example). Holden also found that regional trading blocs, such as SADC, encourage import substitution industrialization, and the author suggested that South Africa's participation in an FTA would lead to trade diversion. Studies have also argued that the limited role an FTA could play in the region results from the fact that tariffs are not the only obstacle to increased regional trade. To explain low trade in southern Africa, several studies have stressed the importance of transport and transaction costs, inadequate infrastructure, lack of diversification in sources of comparative advantage, and underdeveloped production structures (see, for example, Cassim 2000; Chauvin and Gaulier 2002; Davies 1996; Geda and Kibret 2002; Goldstein 2004; Holden 1996; Jenkins, Leape, and Thomas 2000; Longo and Sekkat 2001; Nyirabu 2004; Radelet 1997).

A study by Chauvin and Gaulier (2002) suggested that South Africa, the largest economy in the region, has comparative advantages in primary goods and that these advantages are similar to those of other SADC countries.[5] Mafusire (2002) sought to establish the potential for increasing intra-SADC trade by using revealed comparative advantage (RCA) indices and examining export shares. He concluded that supply rigidities were a major constraint to export performance after economically smaller countries, such as Angola and the DRC, achieved a low ranking in terms of export shares, even though they had superior comparative advantages. The paper by Luximon (2003) used a gravity model to present empirical evidence on the impact of regional trade agreement (RTA) membership on Mauritian exports to SADC member countries. The general conclusion was that regional integration had not had a statistically significant effect on Mauritian exports to the region. The paper used trade compatibility and export similarity indices for Mauritius's major exports to show that trade patterns of countries in the region are not mutually compatible.

Less information can be found on the specific issue of regional integration and agriculture in southern Africa. Although a few studies, such as that by Koester (1986), found potential opportunities for intraregional trade in agricultural products such as live animals, meat, maize, vegetables, sugar and honey, vegetable oils, and animal feed, other studies concluded that SADC countries have limited comparative advantages and that these are usually in the same types of agricultural products. Chauvin and Gaulier (2002) established that "SADC countries had comparative advantages in products they are well endowed in and which are quite similar." In addition, using export diversification indices, they found that exports from SADC countries concentrated on a small number of products, more so than in the case of other developing countries like Chile. A study by Maasdorp (1998), focusing on trade and food security in southern Africa, concluded that regional trade can contribute substantially to improved food security. SADC as a whole has the potential to be self-sufficient in white maize and a wide range of other food crops; there is also considerable scope for greater intraregional trade in grain and other food products and for greater cross-border investment in agriculture and agro-industry.

The limited information and analysis about integration in agriculture, as well as the great diversity of approaches and contrasting results among some of the studies reviewed here, justify further exploration of the impact of an FTA on agriculture in SADC. Some of the literature reviewed for this study used mainly CGE or gravity models based on econometric approaches to analyze the

[5] Some SADC states are concerned that South Africa will benefit the most, as it is the region's economic powerhouse and exports more than it imports from other SADC countries. Indeed, South Africa accounts for about two-thirds of the region's total GDP, approximately 18% of its population, one-fourth of agricultural GDP, and one-half of agricultural trade (World Bank 2008). Hence, South Africa also plays an important role in regional trade and transport. Almost all the continental SADC countries depend on South Africa's railways, airports and seaports, highways, and other transport facilities.

effects of trade in relatively aggregated sectors across SADC economies. Other studies focused on disaggregated trade data at the three- or four-digit SITC level, using indices of revealed comparative advantage and diversification. Only a few focused on agriculture. To complement these studies, we develop a detailed analysis of the impact of an FTA on the agricultural sector of SADC countries, combining the use of the most disaggregated bilateral trade data available and a methodology that is at the same time simple and theoretically sound. Our goal is to assess the potential welfare impacts of an FTA on the agricultural sector of southern African countries and to determine opportunities and challenges faced by the region as a consequence of the agreement.

To do this, we divide the analysis into two parts. In the first part, we take an in-depth look at current trading patterns at a disaggregated level (four-digit SITC level), using the most recent detailed trade data. We ask which are the most important import and export agricultural industries and which are the main trading partners among the 14 SADC countries. These questions are relevant for understanding the regional dynamics in SADC, as the trade structure represented by the leading trading industries is a reflection of the economic structures of the region, as well as of each individual country. This first part of the study is developed in Sections 2 and 3. In Section 2, we characterize agricultural trade in SADC countries and determine the top 10 agricultural export and import industries for each country. In Section 3, we present information on main trading partners and characterize the structure and dynamics of the import and export markets of SADC countries.

The second part of the study focuses on the potential welfare impact of an FTA in agriculture at the regional and country levels. Specifically, we analyze the contribution of different agricultural industries to changes in the welfare of producers and consumers in different countries. We proceed by determining a group of sensitive industries, or industries that have the potential to be traded regionally and at the same time are protected by tariffs. We then classify sensitive industries into two groups: industries facing enhanced protection and industries with reduced protection as a result of an FTA. With industries classified in these groups, we can determine the welfare effects of an FTA for different regions and agents. Section 4 presents the conceptual framework and methodology used for this analysis and the classification of industries in the different groups mentioned above. This methodology is then used in Section 5 to evaluate the welfare impact of an FTA on agriculture. We expect that such analysis will help regional organizations and individual countries evaluate the potential gains of an FTA and of further regional integration (e.g., the creation of a customs union). Section 6 summarizes the findings and discusses policy implications.

2. AN ANATOMY OF AGRICULTURAL TRADE IN SADC COUNTRIES

As mentioned in the Introduction, our analysis starts by identifying the most important agricultural commodities traded in the region. For this study, we use detailed UN Comtrade[6] data of export and import flows across the 14 SADC countries unilaterally (as well as trade with the rest of world) for a period of six years (2000–2005), which was the most recent data available to us. Given the possible high cost of building a long-time series using this data,[7] we consider that the available data give us enough information to consistently determine the base year for our analysis of regional trade liberalization. Although the analysis of market dynamics is not the main purpose of this study, the period covered allows us to analyze recent trade dynamics across different industries and markets, which we include in Sections 2 and 3.

It is well known that official statistic trade reported to UN Comtrade by country statistical authorities has certain quality problems for developing countries, with the most important shortcoming for data from African countries being that they do not include cross-border informal trade on primary agricultural products. Although it is difficult to track all trade through Africa's porous borders, in the case of southern Africa, we have available information on the extent and importance of informal trade on agricultural products. FEWS NET (Famine Early Warning System; see FEWS 2005, 2007) accounts for informal cross-border food trade in southern Africa. The most significant informal trade occurs in major staples such as maize, rice, and beans. FEWS reports that total informal trade of maize in southern Africa in 2004–2005 amounted to 101,928 tons. For that same period, 16,993 tons of rice and 16,773 tons of maize were informally traded in the region. Comparing the informal maize trade data obtained from FEWS with the formal maize trade reported to UN Comtrade, we find that informal maize trade represented 6 percent of total maize trade for the region as a whole (and 16 percent of intraregional maize trade) in 2004–2005. This indicates that the use of UN Comtrade data for our analysis seems to be less questionable in the case of southern Africa. However, because informal trade appears to be relatively important in the case of maize, it should be kept in mind that results for this particular industry (maize) only capture the formal segment of its market.[8]

The UN's four-digit SITC trade data classify agricultural products or product groups into chapters. For this study, we use the following 14 agricultural-related chapters: live animals (00); meat and meat preparations (01); dairy products and eggs (02); fish (03); cereals and cereal preparations (04); vegetables and fruits (05); sugar, sugar preparations, and honey (06); coffee, tea, cocoa, and spices (07); feed stuff for animals (08); miscellaneous edible products and preparations (09); beverages (11); tobacco and tobacco manufactures (12); raw hides, skins, and fur skins (21); and oil seeds and oleaginous fruits (22). This analysis also includes agriculture-related products drawn from other chapters. Throughout this study, we refer to the four-digit categories in the SITC as "industries," given that at this level, they correspond to groups of products that can be identified at the six-digit level or higher if we were to further disaggregate our data. A detailed list of the 193 agricultural industries traded by SADC countries can be found in the Appendix.

Although SADC countries as a group exported or imported products from more than 100 agricultural industries in 2000–2005, we are interested only in a group of export and import industries that encompass the majority of the agricultural trade of these countries during the

[6] The original UN Comtrade data are used in the analysis instead of reconciled bilateral data. Because our analysis is not in a global framework, it is unnecessary to conduct the costly exercise of developing a global data set (e.g., Global Trade Analysis Project, GTAP) to capture balanced bilateral trade flows between partner countries.

[7] The UN Comtrade data set is not a free-access data set if one wants to obtain detail bilateral trade flows for several countries and all agricultural products.

[8] Even though the elimination of tariffs does not have a direct effect on informal trade, as it has on formal trade, changes in formal trade could indirectly affect informal trade. No attempt is made here to capture these effects.

period analyzed. We define major agricultural export or import industries for an SADC country based on the value share of the different industries in that country's total agricultural exports or imports. Thus, the first step of the study is to rank all industries exported or imported according to their value share in a country's total exports or imports. Using these shares at the country level, we then select the top 10 among all import and export industries for each country and for each year (2000–2005) and define them as the main export and import products.

In contrast with more aggregated trade figures, the trade value of industries defined at the four-digit level can change dramatically between years. For a particular country, some industries that appeared in the top 10 list with high shares in one year could well disappear from the list in other years. In order not to miss some industries that could be important for a particular country but that did not appear in the top 10 list in all years, we include as top-ranking industries all those that appeared in the top 10 in at least one year. For this reason, the number of industries included in the top 10 list of the 14 SADC countries for the period 2000–2005 is greater than 10. The total number of top 10 export industries for each country is presented in Table 1 in the next section, while the following sections presents similar information for imports.

Which are the Most Important Agricultural Export Industries?

The first column in Table 1 presents the total number of agricultural industries in each SADC country that exported products from 2000 to 2005. Although the database for the world as a whole includes more than 190 industries, only one SADC country—South Africa—exported products from all these industries in that period. Two other countries, Tanzania and Zimbabwe, exported products from about 180 agricultural industries. Of the 14 countries, Angola had the least number of exporting agricultural industries, with 100 in total. On average, SADC countries exported from 158 agricultural industries in this period.

The second column in Table 1 reports the number of top 10 export industries for each SADC country. No country had the same 10 top-ranking export industries from 2000 to 2005. Due to changes in the ranking of export industries over time, between 13 to 18 industries appeared in the top 10 ranking in different countries during this period, with an average of 15 industries.

According to our figures in the third column of Table 1, the average share in agricultural export value of the top 10 exporting industries for the region as a whole was 88 percent. Top 10 ranking commodities accounted for more than 80 percent of total agricultural exports in all countries, with the exception of South Africa (59.6 percent). In nine of these countries, the top 10 commodities accounted for more than 90 percent of the total value of agricultural exports.

Table 1. Number of top 10 agricultural export industries for SADC countries, 2000–2005

Exporter	Top 10 industries			Ranking dynamics of top 10 product items					
				No change[2]		Moving up[3]		Moving down[4]	
	Total # of agricultural export industries	# of top 10 industries[1]	Share in agricultural export value	# of industries	Share in agricultural export value	# of industries	Share in agricultural export value	# of industries	Share in agricultural export value
Angola	100	13	96.5	6	74.2	4	6.2	3	16.1
Botswana	173	17	92.2	4	66.7	6	7.0	7	18.4
DRC	118	14	95.3	6	80.9	4	4.9	4	9.6
Lesotho	124	17	82.4	3	10.4	4	1.0	10	71.0
Madagascar	155	16	91.8	12	87.5	2	1.9	2	2.5
Malawi	144	15	97.7	6	91.9	4	2.7	5	3.1
Mauritius	166	15	95.3	11	93.4	2	0.7	2	1.2
Mozambique	155	16	91.3	5	60.3	5	14.9	6	16.1
Namibia	174	16	91.3	3	69.2	8	8.9	5	13.3
South Africa	193	13	59.6	8	42.4	3	11.5	2	5.7
Swaziland	177	16	90.0	8	80.0	4	4.2	4	5.8
Tanzania	187	13	79.4	5	53.5	4	9.0	4	16.8
Zambia	161	12	84.4	5	24.7	4	38.0	3	21.8
Zimbabwe	182	18	87.3	11	80.5	3	3.0	4	3.8
Average	158	15	88.2	7	65.4	4	8.1	4	14.7

Notes: 1. The number of top 10 industries is greater than 10 if industries that appeared in the top 10 list differed across years in 2000–2005.

2. The number of industries that appeared in the top 10 list for the entire period 2000–2005 and that have a stable ranking—that is, there is no correlation between their ranking and a time trend

3. The number of industries that appeared in the top 10 list and that moved up to higher ranks during the period—that is, their ranking shows a negative coefficient against a time trend (the highest rank marks as 1 and the lowest rank as 10)

4. The number of industries that appeared in the top 10 list and that moved down to lower ranks during the period—that is, their ranking shows a positive coefficient against a time trend

Source: Authors' calculation based on UN Comtrade data.

The results presented so far indicate that for most SADC countries, agricultural exports are concentrated in a few industries.[9] Such an export structure can significantly reduce the possibility of intraregional trade among SADC countries, reducing the likelihood of matching import demand from SADC countries with the small number of industries exported by other SADC countries.

Although a six-year period may not be long enough for a dynamic analysis of structural changes in agricultural exports in SADC countries, we can still observe certain changes during this period. In this paper, we analyze the dynamics of the importance of different export and import industries for SADC countries by looking at changes in the rankings of the top 10 industries. The fourth column of Table.1 reports the number of industries among the top 10 that did not show a significant change of position in ranking between 2000 and 2005.[10] The number of such industries ranges from 3 to 12 for the different countries, with an average of 7 for the region as a whole. Industries with a stable ranking play a dominant role, as they account, on average, for 65 percent of agricultural exports in SADC countries. However, for some countries, such as Zambia, Mozambique, Tanzania, Lesotho, and South Africa, the share of stable-ranking industries in total agricultural exports is below 50 percent. The most significant change in the ranking of agricultural industries occurred in Lesotho and Zambia. In the case of Lesotho, only three industries have a stable ranking, and together they account for only 10 percent of the country's total agricultural exports in this period. In Zambia, on the other hand, there are five such industries, accounting for 25 percent of total exports.

Columns six and eight of Table 1 report the number of industries moving in the ranking of top 10 industries. Among the 14 SADC countries, between two and eight industries moved up and between two and 10 industries moved down between 2000 and 2005. Whereas for most countries the share of products in total agricultural exports moving up in the ranking is not large, some countries did see significant change. Again, Zambia showed the most significant changes in industry ranking, with four industries moving up in the ranking accounting for 38 percent of the country's total agricultural exports in 2000–2005. Significant change also occurred in Mozambique, where five industries moved up in the ranking, accounting for 15 percent of that country's total agricultural exports.

Structural change in exports is also reflected in industries whose importance among major agricultural exports declined over time. Obviously, for countries in which we observe a relatively large share of industries moving up in the ranking, we expect to see a similar share of industries moving down in the ranking. For example, in the case of Zambia, three industries moved down in the ranking in 2000–2005, accounting for 22 percent of total exports.

In looking at the list of top 10 exporting agricultural industries for the 14 SADC countries, we found 92 different agricultural export industries. Table 2 shows the 40 most important industries, with the remaining 52 aggregated at the bottom of the table. These 92 industries account, on average, for US$8 billion in exports annually and for 73.4 percent of total SADC agricultural exports in 2000–2005.

[9] Indices of trade concentration and specialization were originally derived from indices employed in industrial product and industrial structure. Our measure of specialization is analogous to the C3 or C6 concentration indices, which indicate the fraction of industry sales generated by the three and six largest firms, respectively. This index was chosen because the analysis in Sections 2 and 3 focuses precisely on the top 10 most important traded agricultural industries and the top 10 import and export markets.

[10] This is measured by regressing the ranking of each industry in each country and year against a trend. A significant coefficient of the trend line is assumed to show that a particular industry is moving up or down in the ranking, depending on the sign of the coefficient.

Table 2. Top 10 agricultural industries of SADC countries, 2000–2005

SITC	Description	Value (millions of US$)	Share in total	Average ranking	SD	# of SADC countries
		(a)	(b)	(c)	(d)	(e)
1210	Tobacco	982,447	9.1	3	0.97	6
0311	Fish, fresh, chilled, or frozen	851,416	7.8	6	1.30	8
0611	Raw sugar, beet & cane	816,640	7.5	4	0.93	9
1121	Wine of fresh grapes & grape juice	481,098	4.4	1	0.75	1
0313	Crustacea & mollusks, fresh, chilled	462,908	4.3	7	1.30	8
0511	Oranges, tangerines & clementines	454,252	4.2	5	1.01	3
0515	Grapes	414,267	3.8	5	1.69	2
0519	Fresh fruit	359,751	3.3	4	0.42	2
6318	Wood, simply shaped or worked	353,954	3.3	5	1.21	1
2631	Raw cotton	309,862	2.9	6	1.53	8
0752	Spices, exc. pepper & pimento	231,634	2.1	6	1.67	2
0514	Apples, fresh	219,008	2.0	8	0.90	1
0440	Maize	193,206	1.8	8	2.28	6
0539	Fruit & nuts, prepared or preserved	189,114	1.7	7	0.99	2
0512	Other citrus fruit	180,109	1.7	7	1.36	2
0320	Fish, in airtight containers	129,113	1.2	6	1.02	5
0111	Meat of bovine animals	123,719	1.1	5	0.93	5
0535	Fruit & vegetable juices	117,137	1.1	11	1.36	2
0711	Coffee, green or roasted	113,875	1.0	7	1.74	7
0741	Tea	100,445	0.9	6	1.14	3
2927	Cut flowers & foliage	98,369	0.9	7	1.26	4
0517	Edible nuts, fresh or dried	88,067	0.8	5	1.31	3
0990	Food preparations	78,249	0.7	7	1.76	4
2423	Saw & veneer logs, nonconifer	68,347	0.6	6	1.19	5
6513	Cotton yarn & thread, gray	44,158	0.4	9	1.62	3
0612	Refined sugar & other products	34,411	0.3	9	2.18	6
1123	Beer, including ale, stout, porter	33,866	0.3	7	2.05	3
1110	Nonalcoholic beverages	32,905	0.3	7	4.43	3
0545	Other fresh vegetables	31,877	0.3	7	1.16	2
0542	Beans, peas, lentils, dried	29,219	0.3	9	1.59	3
2433	Lumber, sawn, planed	26,704	0.2	7	1.53	4
2218	Oil seeds, oil nuts & oil kernels	24,245	0.2	10	2.19	2
2634	Cotton, carded or combed	21,221	0.2	9	3.39	2
1223	Tobacco, manufactured	18,398	0.2	7	3.49	1
6114	Leather of other bovine cattle	16,356	0.2	9	2.55	3
0814	Meat & fish meal	15,106	0.1	7	2.66	3
0012	Sheep, lambs & goats	14,926	0.1	6	1.50	1
0620	Sugar confectionery & other sugar	13,276	0.1	5	2.69	2
2929	Materials of vegetable origin	12,966	0.1	6	1.34	2
0460	Meal and flour of wheat	11,386	0.1	9	2.08	4
	Remaining 52 items	168,681	2.2	9	2.56	1
	92 items total	7,966,689	73.4	—	—	—

Notes: (a) All countries average per year in 2000–2005; (b) share in SADC total exports; (c) average ranking across countries; (d) standard deviation from the average ranking; (e) countries for which the industry is in the top 10 list.

Source: Authors' calculation based on UN Comtrade data.

Which are the Most Important Agricultural Import Industries?

Table 3 presents the total number of agricultural import industries and the number of top 10 major import industries for SADC countries between 2000 and 2005. Unlike exports, SADC countries import products from almost all the industries included in the data (193 industries), with only two countries—the DRC and Madagascar—having fewer than 180 import industries. The average number of import industries for an SADC country is 188. The number of top 10 ranking import industries is usually greater than that of the top 10 export industries, averaging 18 import industries compared with 15 exports. On the other hand, the share of the value of imports from the top 10 import industries in total agricultural imports is usually smaller than the share of the value of exports from top 10 exporting industries. In seven countries, the share of top 10 importing industries is less than 60 percent of each country's total imports. In the case of exports, however, only South Africa's share of top 10 industries accounts for less than 60 percent of agricultural exports. On average, the top 10 import industries account for 60 percent of SADC's total agricultural imports. These results indicate that compared with exports, and with few exceptions, the import structure of SADC countries is much more diverse than their export structure.

As can be seen in Table 3, the structure of imports at the individual country level changed more in 2000–2005 than did the structure of exports. Only five import industries, on average, did not change their ranking position in the six-year period considered here. The products with stable ranking account for only 25 percent of SADC total agricultural imports, and in 8 of the 14 countries, this share accounts for less than or close to 20 percent. Surprisingly, a country that shows a dynamic export structure, such as Tanzania, does not show a similar situation in its import structure. For example, the top 10 export industries with stable ranking accounted for 54 percent of Tanzanian agricultural exports, below the average for the 14 countries. In the case of the top 10 import industries, however, 69 percent of Tanzanian imports are of products in industries with stable ranking, compared with an average of 25 percent for the 14 SADC countries.

Table 3. Number of top 10 agricultural import industries for SADC countries, 2000–2005

Exporter	Total # of agricultural import industries	Top 10 items		Ranking dynamics of top 10 product items					
		# of top 10 industries[1]	Share in agricultural import value	No change[2]		Moving up[3]		Moving down[4]	
				# of industries	Share in agricultural import value	# of industries	Share in agricultural import value	# of industries	Share in agricultural import value
Angola	182	14	59.3	4	19.2	5	18.8	5	21.4
Botswana	193	19	47.1	1	0.5	7	6.2	11	40.3
DRC	177	15	69.7	5	28.4	4	19.3	6	22.0
Lesotho	189	19	47.8	2	3.2	10	13.2	7	31.4
Madagascar	174	16	80.7	8	47.1	3	9.9	5	23.7
Malawi	187	17	49.5	7	14.3	5	22.7	5	12.5
Mauritius	190	15	61.6	9	53.2	3	5.1	3	3.3
Mozambique	187	21	68.6	7	38.5	9	24.8	5	5.3
Namibia	190	21	54.3	2	6.0	8	10.5	11	37.9
South Africa	193	15	47.6	5	17.5	6	19.3	4	10.7
Zimbabwe	185	21	69.5	6	14.1	8	46.9	7	8.5
Swaziland	190	22	50.2	2	6.9	9	9.2	11	34.1
Tanzania	191	17	80.0	7	68.6	5	7.0	5	4.5
Zambia	189	15	61.6	5	34.5	6	18.9	4	8.2
Average	187	18	60.5	5	25.1	6	16.6	6	18.8

Notes: 1. The number of top 10 industries is greater than 10 if the industries that appeared in the top 10 list differed across years between 2000 and 2005.

2. The number of industries that appeared in the top 10 list for the entire period of 2000–2005 and their ranking is stable—that is, there is no correlation between their ranking and a time trend

3. The number of industries that appeared in the top 10 list and moved up to higher ranks during the period—that is, their ranking shows a negative coefficient against a time trend (the highest rank marks as 1 and the lowest rank marks as 10)

4. The number of industries that appeared in the top 10 list and moved down to lower ranks during the period—that is, their ranking shows a positive coefficient against a time trend

Source: Authors' calculation based UN Comtrade data.

For the SADC region as a whole, and with only two exceptions, the number of top 10 import industries whose ranking changed in 2000–2005 is more than the number of industries with stable ranking. On average, six top 10 import industries moved up and six moved down in the ranking. The top 10 industries moving up in the ranking account for 17 percent of the region's total agricultural imports, whereas the ones moving down account for 19 percent. These results indicate that compared with exports, the structure of SADC imports is relatively more dynamic. This dynamism provides an opportunity to promote intraregional trade from the demand side.

As in the case of exports, Table 4 presents a list of top 10 major import industries. Although imports are relatively diverse across SADC countries, the total number of different top 10 import industries is 71, smaller than the number of top 10 export industries (92). The share of these 71 industries in total agricultural imports of SADC countries is also smaller—56.6 percent compared with 73.4 percent in the case of exports. Another difference from exports is that almost all SADC countries (11–12) are major importers of cereals (rice, wheat, and maize), which account for 14 percent of SADC's total agricultural imports. Although the importance of cereal imports for most SADC countries provides an opportunity from the demand side to promote intraregional trade in cereals, the possibility of some of these countries producing enough cereals to meet such demand remains a challenge. After cereals, there are 19 industries included in the list of top 10 import industries in at least five countries. Imports of these 19 industries account for 34 percent of the region's total agricultural imports. With cereals, they represent almost 50 percent of agricultural imports in most countries.

In summary, SADC agricultural exports are more concentrated than imports. In 10 countries, the top 10 industries represent more than or close to 90 percent of total agricultural exports. In contrast, in only two countries do the top 10 industries represent 80 percent of their agricultural imports. Preliminary evidence shows structural change in both exports and imports, with the import structure seemingly more dynamic than the export structure. The top 10 import industries with stable ranking account for only 27 percent of regional agricultural imports, while in the case of exports, industries with stable ranking account for 71 percent of regional agricultural exports. For some countries, such as Lesotho, Mozambique, Tanzania, and Zambia, a significant share of agricultural exports is in industries whose position in the top 10 list moved either up or down. The largest structural change in exports occurred in Zambia, where industries moving up in the top 10 ranking account for more than 50 percent of Zambia's agricultural exports. On the import side, industries whose ranking position changed over time accounted for more than 50 percent of imports in eight countries. Tanzania is a special case, showing high dynamism in its export structure, with a relatively stable import structure.

Table 4. Top 10 agricultural import industries of SADC countries, 2000–2005

SITC	Description	Value (millions of US$)	Share in total	Average ranking	SD	# of SADC countries
0422	Rice	348,310	5.5	5	1.9	12.0
0410	Wheat	316,882	5.0	5	2.7	12.0
0990	Food preparations	244,028	3.9	7	2.0	14.0
0440	Maize	219,953	3.5	6	3.2	11.0
4222	Palm oil	189,525	3.0	6	1.8	8.0
0114	Poultry	165,872	2.6	6	1.8	7.0
4212	Soya bean oil	159,151	2.5	7	2.2	9.0
6513	Cotton yarn & thread, gray, not mercerized	118,734	1.9	6	2.5	5.0
1124	Distilled alcoholic beverages	118,442	1.9	8	3.0	5.0
0460	Meal & flour of wheat	115,417	1.8	6	1.6	7.0
0813	Oil seed cake & meal	112,801	1.8	4	1.1	1.0
1210	Tobacco	105,724	1.7	7	2.6	5.0
0222	Milk & cream in solid form, blocks, or powder	101,262	1.6	9	1.8	10.0
0311	Fish, fresh, chilled, or frozen	98,381	1.6	6	2.9	4.0
2631	Raw cotton, other than linters	91,862	1.5	7	1.9	6.0
0611	Raw sugar, beet & cane	88,924	1.4	8	2.8	9.0
2433	Lumber, sawn, planed, etc., nonconifer	88,630	1.4	10	2.3	2.0
0612	Refined sugar & other products	88,176	1.4	7	2.7	6.0
1123	Beer including ale, stout & porter	80,660	1.3	8	2.6	3.0
0470	Meal & flour of cereals exc. Wheat	75,848	1.2	7	2.4	7.0
5995	Starches, insulin, gluten	73,729	1.2	11	2.4	3.0
1110	Nonalcoholic beverages	69,054	1.1	6	1.4	5.0
6512	Yarn of wool and animal hair	54,343	0.9	5	0.6	2.0
6114	Leather of other bovine cattle & equine leather	52,802	0.8	12	2.0	1.0
1121	Wine of fresh grapes, including grape must	43,689	0.7	9	2.1	4.0
0111	Meat of bovine animals	40,969	0.6	6	1.2	2.0
0819	Food wastes & prepared animal feed	32,171	0.5	5	1.7	4.0
1222	Cigarettes	32,041	0.5	9	3.1	7.0
0482	Malt, including malt flour	26,887	0.4	10	2.9	7.0
4216	Sunflower seed oil	21,200	0.3	9	3.6	6.0
0542	Beans, peas & lentils	21,099	0.3	8	1.9	7.0
0535	Fruit & vegetable juices	18,354	0.3	9	1.9	3.0
0134	Sausages, whether or not in airtight containers	15,224	0.2	13	2.5	1.0
0620	Sugar confectionery & other sugar preparations	14,597	0.2	10	2.7	3.0
0223	Milk & cream, fresh	13,861	0.2	8	2.0	2.0
0240	Cheese & curd	11,185	0.2	11	1.7	1.0
0112	Meat of sheep & goats, fresh, chilled, or frozen	10,049	0.2	12	2.0	1.0
0619	Sugars & syrups, incl. art. honey & caramel	8,272	0.1	4	0.9	1.0
4313	Acid oils, fatty acids & solid residues	8,080	0.1	10	1.5	2.0
2219	Flour & meal of oil seeds, nuts, kernels, fat	7,700	0.1	9	3.1	2.0
0312	Fish, salted, dried, or smoked	7,456	0.1	10	1.6	1.0
0320	Fish, in airtight containers	6,538	0.1	8	2.1	2.0
	Remaining 29 items	62,170	1.0	9	3.0	1.0
	71 items total	3,580,051	56.6			

Source: Authors' calculation based on UN Comtrade data.

3. MAJOR AGRICULTURAL MARKETS FOR SADC COUNTRIES

In this section, we analyze destination and source markets for SADC's agricultural exports and imports and define the group of major partners for the region according to the share of these markets in the exports and imports of SADC countries. The importance of each market is defined as in Section 2, using the share of a particular market in the total agricultural exports or imports of SADC countries. We proceed by first identifying the top 10 markets for all SADC countries. We then focus on the dynamics of these major export and import markets by identifying markets that show a significant coefficient in a regression of ranking against a trend during 2000–2005 and by identifying those markets with stable rankings over the same period. The results of these calculations are reported in Table 5.

Which are the Most Important Markets for SADC Agricultural Exports?

The first column of Table 5 shows the number of destination markets for agricultural exports from each SADC country between 2000 and 2005. On average, SADC countries have 83 trade partners that imported their agricultural products. For individual SADC countries, the number of trade partners ranks from as low as 20 for Lesotho to as high as 150 for South Africa. The second column of Table 5 reports the number of trading partners whose share of imports ranked in the top 10 list for each SADC country. On average, SADC countries have 15 top 10 import partners, with most SADC countries having more than 14 trading partners in the top 10 list due to changes in the share of imports taken by different partners over time. The third column reports the aggregate share of these top 10 markets for agricultural exports from SADC countries. With two exceptions, Lesotho and Tanzania, the top 10 markets capture more than or close to 90 percent of agricultural exports from SADC countries, with the average share being 93 percent. Combined with findings from Table 1, Table 5 seems to indicate that SADC agricultural exports are concentrated not only in terms of products but also in terms of markets.

We next look at changes in the importance of different markets for agricultural exports from SADC countries. Column four of Table 5 shows the number of markets whose ranking is stable over time, while column five shows the share of those markets in each country's total exports. Although less than half of the importers show stable rankings during the time period, most of these stable markets are the most important markets for SADC exports, because their share of agricultural exports from each SADC country is quite high. However, some countries show changes in the ranking of their export markets. For example, stable markets account for only 45 percent of Zambian agricultural exports and for 56–62 percent for Mozambique, Swaziland, and Tanzania. The six markets that moved up in the ranking account for 49 percent of Zambian exports, while five similar markets account for 36 percent of Mozambique's agricultural exports. As the export markets in Zambia and Mozambique show a significant structural change, these results seem to indicate a relationship between dynamics in export markets (trading partners) and dynamics in export structure (trading commodities).

Table 5. Number of top 10 agricultural export markets for SADC countries, 2000–2005

Exporter	Total # of agricultural export markets	Top 10 markets		Ranking dynamics of top 10 markets					
		# of top 10 markets[1]	Share in agricultural export value	No change[2]		Moving up[3]		Moving down[4]	
				# of markets	Share in agricultural export value	# of markets	Share in agricultural export value	# of markets	Share in agricultural export value
Angola	40	17	98.2	6	95.4	6	2.5	5	0.4
Botswana	41	15	99.8	6	99.2	2	0.6	7	0.0
DRC	54	19	99.1	7	93.1	6	5.4	6	0.6
Lesotho	20	11	78.2	3	78.1	2	0.0	6	0.1
Madagascar	105	15	97.2	9	93.2	4	3.7	2	0.3
Malawi	104	13	89.2	7	65.7	4	15.2	2	8.3
Mauritius	90	14	96.2	8	93.4	3	1.9	3	0.9
Mozambique	82	14	95.1	5	55.9	5	35.7	4	3.5
Namibia	91	14	97.9	6	90.7	5	7.0	3	0.1
South Africa	150	14	87.6	11	85.5	2	2.2	1	0.0
Zimbabwe	101	15	92.7	10	84.8	2	5.4	3	2.5
Swaziland	81	18	96.4	5	60.6	7	29.4	6	6.5
Tanzania	121	15	82.5	6	62.1	4	15.2	5	5.2
Zambia	78	16	96.0	4	45.0	6	49.1	6	1.9
Average	83	15	93.3	7	78.8	4	12.4	4	2.2

Notes: 1. The number of top 10 markets is greater than 10 if the markets that appeared in the top 10 list differed across years during 2000–2005.

2. The number of markets that appeared in the top 10 list for the entire 2000–2005 period and their ranking is stable—that is, there is no correlation between their ranking and a time trend

3. The number of markets that appeared in the top 10 list and moved up to higher rankings during the period—that is, their ranking shows a negative coefficient against a time trend (the highest rank marks as 1 and the lowest rank marks as 10)

4. The number of markets that appeared in the top 10 list and moved down to lower rankings during the period—that is, their ranking shows a positive coefficient against time trend

Source: Authors' calculation based on UN Comtrade data.

Table 6 presents a list of the major markets (importing countries or regions) for agricultural exports from SADC countries. The table provides details of the 13 largest markets, with figures for the remaining 11 markets aggregated in a single row. There is a total of 210 major export destinations for the 14 SADC countries. Several markets repeat across the top 10 list of most countries, so we count only the number of different markets; thus the number of top 10 markets for the entire region reduces to 24, with 13 of those being the most important. These 13 markets account for 88.4 percent of SADC's agricultural exports. Our results indicate a high concentration of agricultural exports in a few markets. Column five of Table 6 shows similar market concentration, as the top seven trading partners are the same for exports from almost all SADC countries. As expected, the EU/EFTA (European Free Trade Association) is the most important market for SADC exports, accounting for 45.7 percent of the region's agricultural exports. Encouragingly, with 18 percent of market share, intraregional trade is the second most important market for SADC countries. Japan, China, the United States, Canada, and the rest of Sub-Saharan Africa are also important export markets for SADC, all together accounting for 18.4 percent of total agricultural exports, which is similar to intraregional trade.

Table 6. Top 10 agricultural export markets of SADC countries, 2000–2005

Description	Value (millions of US$)	Share in SADC exports	Average ranking	Standard deviation	# of SADC countries
EU15/EFTA	4,957,828	45.7	1	0.2	14
SADC	1,967,395	18.1	3	1.3	14
Japan	787,838	7.3	5	1.3	12
China	487,881	4.5	5	1.3	13
USA-Canada	384,024	3.5	6	1.4	13
Rest of Sub-Saharn Africa	339,305	3.1	6	1.8	14
South & Southeast Asia	146,245	1.3	9	1.8	14
Middle East	139,258	1.3	8	2.2	9
Russia	120,148	1.1	9	2.1	8
India	115,085	1.1	7	1.0	5
Australia-New Zealand	85,965	0.8	9	1.2	5
North Africa	31,930	0.3	10	2.8	6
Eastern Europe	29,700	0.3	11	2.0	9
Other 11 countries	31,492	0.3	10	1.5	1
Total 24 countries	9,624,093	88.7			

Source: Authors' calculation based on UN Comtrade data.

Table7 shows the dynamics of export markets for each SADC country. Although the countries listed in Table 7 are not the most important import partners for the region as a whole, their importance in SADC's agricultural exports is growing. For example, in 2000, China ranked 11th as a destination market for agricultural exports from the DRC, Namibia, Tanzania, and Zambia. In 2005, China moved to fourth or fifth place in the ranking of major markets, significantly increasing its importance for these four SADC countries. A similar change is observed in the rank of the Middle East region as an import partner for Malawi, Mozambique, and Tanzania. In 2000, this region ranked as the 11th most important export destination for these three SADC countries, moving to sixth or seventh place by 2005.

Table 7. Dynamics of selected import partners for SADC countries

Import country/region	Export country	Initial 2000	Final 2005
Russia	South Africa, Zambia	+15	11
India	Madagascar	+15	7
China	DRC, Namibia, Tanzania, Zambia	11	4–5
Australia-New Zealand	Swaziland	5–6	3
Eastern Europe	Angola, Mauritius, Namibia, Swaziland	13–14	8–9
Middle East	Malawi, Mozambique, Tanzania	11	6–7
North Africa	DRC	+15	4
South & Southeast Asia	Lesotho, Mozambique, Namibia, Swaziland, Zambia	5–6	4–5
USA-Canada	Madagascar	7	5

Source: Authors' calculation based on UN Comtrade data

Which are the Most Important Agricultural Exporters to SADC Countries?

Table 8 presents a summary of the number of trade partners exporting agricultural commodities to SADC countries during 2000–2005. The table also shows the most important suppliers in the top 10 list of individual SADC countries and presents information on the dynamic behavior of these supply markets. The first column of Table 8 shows that SADC countries turn to more markets for their imports than for their exports, which is consistent with the relatively more diverse import structure presented in Table 3. An average SADC country imports from 109 countries to meet its demand for agricultural products and exports to 88 countries, as shown in Table 5. The number of countries in the top 10 list of exporting countries to SADC is also, in general, larger than the number of top 10 countries importing from SADC. In the case of imports, 16–18 countries appear in the top 10 list as the most important sources of imports for nine SADC countries. For the remaining five SADC countries, the number of top 10 exporting countries is 12–14. For most countries, agricultural imports are concentrated in a few trading partners. In 12 SADC countries, the top 10 exporting partners supplied more than or close to 90 percent of total agricultural imports. The exceptions are Botswana and Tanzania; for these two countries, the top 10 exporting partners supplied 77 and 81 percent, respectively, of the total value of imported agricultural products.

Column four of Table 8 shows the number of markets with a stable ranking over time. In eight countries (Angola, the DRC, Madagascar, Malawi, Mauritius, South Africa, Zimbabwe, and Tanzania), more than a half of their trade partners show stable rankings over time. In the cases of Botswana and Namibia, only two trading partners have stable rankings. Particular market dynamics can also be observed in the export partners of Lesotho, Mozambique, Swaziland, and Zambia. In the cases of Zambia and Mozambique, only 5–6 partners have stable rankings in the top 10 list, while for Lesotho and Swaziland, 8–9 partners have rankings that moved up during 2000–2005. The significant change in trading partners for Lesotho and Swaziland has a close relationship with changes in their import structures. As shown in Table 3, total imports of products from industries that moved up over time accounted for 95 and 58 percent of agricultural imports in Lesotho and Swaziland, respectively.

Table 8. Number of top 10 markets as sources of SADC countries' agricultural imports, 2000–2005

Exporter	Total # of agricultural supply markets	Top 10 markets		Ranking dynamics of top 10 markets					
		# of top 10 markets[1]	Share in agricultural import value	No change[2]		Moving up[3]		Moving down[4]	
				# of markets	Share in agricultural import value	# of markets	Share in agricultural import value	# of markets	Share in agricultural export value
Angola	99	14	95.9	8	84.1	4	11.8	2	0.0
Botswana	70	18	76.8	2	61.6	7	13.9	9	1.3
DRC	83	14	97.0	9	90.6	2	6.4	3	0.0
Lesotho	46	16	100.0	4	7.3	8	91.6	4	1.1
Madagascar	122	14	92.8	8	75.0	3	13.6	3	4.2
Malawi	108	16	93.5	9	82.8	3	9.3	4	1.4
Mauritius	161	14	90.6	12	85.2	2	5.4	—	—
Mozambique	114	17	90.1	6	39.8	5	25.2	6	25.1
Namibia	106	17	97.6	2	39.1	9	56.0	6	2.5
South Africa	198	12	87.8	8	59.4	1	11.1	3	17.2
Zimbabwe	87	16	99.6	9	98.2	4	1.3	3	0.1
Swaziland	86	17	93.7	4	26.9	9	66.8	4	0.0
Tanzania	133	16	81.1	9	66.3	3	11.9	4	2.9
Zambia	113	16	98.8	5	82.9	7	15.3	4	0.6
Average	109	16	92.5	7	78.8	4	12.4	4	2.2

Notes:

1. The number of top 10 markets is greater than 10 if the markets that appeared in the top 10 list differed across years during 2000–2005.

2. The number of markets that appeared in the top 10 list for the period 2000–2005 and their ranking is stable—that is, there is no correlation between their ranking and the time trend

3. The number of markets that appeared in the top 10 list and moved up to higher ranks during the period—that is, their ranking shows a negative coefficient against the time trend (the highest rank is 1 and the lowest rank is 10)

4. The number of markets that appeared in the top 10 list and moved down to lower ranks during the period—that is, their ranking shows a positive coefficient against the time trend

Source: Authors' calculation based UN Comtrade data.

As in the case of export markets, a list of imports to SADC markets from major partners is presented in Table 9. Of the 22 countries included in the list of major partners exporting to the region, 12 countries/regions provide 82 percent of SADC's agricultural imports, indicating a concentration in import markets. In contrast with export markets, intra-SADC trade is the major source of agricultural imports for the region, accounting for 31 percent of these imports into SADC countries. The EU/EFTA still plays a major role as a source of imports for the region, accounting for 21 percent of SADC's agricultural imports. As in the case of export markets, most SADC countries import from a group of regions or countries that have the highest rankings for regional agricultural imports, another indicator of import market concentration.

Table 9. Top 10 agricultural import markets of SADC countries, 2000–2005

Country/region	Value (thousands of US$)	Share in SADC imports	Average ranking	Standard deviation	# of SADC countries
SADC	1,958,410	30.9	2	0.7	14
EU15/EFTA	1,298,874	20.5	2	0.7	14
Argentina	407,591	6.4	6	2.1	13
Brazil	320,236	5.1	8	2.2	11
India	291,840	4.6	7	2.3	13
USA-Canada	227,622	3.6	7	1.6	13
South & Southeast Asia	199,105	3.1	9	2.0	14
Australia-New Zealand	195,225	3.1	8	2.0	10
China	177,047	2.8	9	2.1	14
Rest of Sub-Saharan Africa	78,838	1.2	6	2.0	10
Middle East	22,706	0.4	11	2.1	8
North Africa	14,366	0.2	8	1.7	3
Other 10 countries	27,793	0.4	9	2.8	1
Total 22 countries	5,219,653	82.5	—	—	—

Source: Authors' calculation based on UN Comtrade data.

Table 7 presents an analysis of the dynamics of import markets that is similar to that presented for exports in Table 5. Over time, 12 countries or regions have become more important as suppliers of agricultural products to SADC countries. Brazil, Australia, New Zealand, Argentina, the United States, and Canada have strong comparative advantages in the production of maize, wheat, oilseeds, livestock, fruits, vegetables, and food-processing products. Table 10 shows that these countries have raised in rank as important agricultural suppliers to SADC countries over time. The increased importance of these countries as suppliers of agricultural imports to SADC indicates that in the event of a regional trade agreement, SADC exporters will face strong competition from extraregional suppliers. Some other developing countries, including China and India, also show growing importance as sources of agricultural imports in a few SADC countries.

Table 10. Dynamics of selected export partners to SADC countries

Export country/region	Import SADC country	Rank	
		Initial 2000	Final 2005
Brazil	Botswana, DRC, Mauritius, Mozambique, Namibia, South Africa, Swaziland	14	8
Australia-New Zealand	Mauritius	7	6
Argentina	DRC, Namibia, Swaziland, Tanzania	15	7
USA-Canada	DRC, Malawi, Swaziland, Tanzania, Zambia	7	6
China	Angola, Botswana, Zimbabwe	13	7
Seychelles	Malawi, Mauritius	16	10
South & Southeast Asia	Angola, Botswana , Mozambique, Namibia, Zimbabwe	7	8
Rest of Sub-Saharan Africa	Lesotho, Namibia, Zambia, Zimbabwe	12	8
Middle East	Botswana, Malawi, Mozambique, Zambia	16	9
Japan	Namibia	16	3
India	Botswana, Lesotho, Madagascar, Namibia, Zimbabwe, Swaziland, Tanzania, Zambia	10	7
North Africa	Zambia	16	9

Source: Authors' calculation based on UN Comtrade data.

4. ASSESSING THE POTENTIAL IMPACT OF A REGIONAL INTEGRATION AGREEMENT-CONCEPTUAL FRAMEWORK

Background and Previous Studies

The term *regional integration agreement (RIA)* is used by Schiff and Winters (2003) "to avoid any unsubstantiated pejorative implications and to convey that arrangements can extend well beyond international trade into areas such as investment, domestic regulation, domestic policies, standards, infrastructure, and politics." For Evans et al. (2004), RIA is a general term that refers to a whole spectrum of levels of economic integration, from the lowest level of integration represented by trade preferences, or partial scope agreements, that liberalize trade in specific commodities or sectors to the common market. For Baldwin and Venables (1995), discriminatory policy is a defining characteristic of an RIA. Baldwin and Venables distinguished three types of RIAs: A free trade agreement (FTA) is an RIA that removes tariffs among members but leaves them with autonomy to set their tariffs with nonmember countries. A customs union (CU) applies a common tariff structure to trade with nonmembers. A common market (CM) allows free movement of factors of production, as well as goods and services, between member states. Panagariya (1999) included FTAs, CUs, and partial trade preferences under the denomination of preferential trade agreements (PTAs) in order to make explicit the discriminatory nature of these arrangements.

Baldwin and Venables (1995) classified the economic effects of an RIA into three main groups: allocation, accumulation, and location effects. The analysis of allocation effects deals with changes in the static allocation of resources and the welfare changes resulting from these allocations as a consequence of RIAs. The standard analysis of potential allocation gains from RIAs derives from the Heckscher-Ohlin-Samuelson (HOS) framework of comparative advantage, which explains gains from trade arising as a result of differences in factor endowments. Within the HOS framework, the core theoretical analysis is the theory of CUs, with contributions from the theory of second best, which concerns what happens when one or more optimal conditions are not satisfied given that RIAs, as mentioned above, are essentially discriminatory policies (Viner 1950; Meade 1955; Kemp and Wan 1976). Under this approach, the welfare impacts of an RIA (trade creation, trade diversion, and terms of trade effects) are determined by a few crucial variables: changes in commodity trade in the countries within the RIA, changes in trade between the RIA and the rest of the world, and changes in international prices facing the countries (Burfisher, Robinson, and Thierfelder 2003; Panagariya 2000). When a country applies the same tariff to all nations, it will always import from the most efficient producer (lower price); trade diversion occurs when discriminatory tariff liberalization leads a country to import from a supplier that is not the lowest cost source, thereby reducing domestic welfare. When increased trade is associated with a switch from higher-cost suppliers to lower-cost suppliers—that is, the supplier in the RIA is more efficient than the supply source before the establishment of the RIA—the RIA is said to be "trade creating" (Panagariya 2000).[11]

Accumulation effects refer to the growth effects of RIAs, given that they affect the return on investment (physical and human capital). Baldwin and Venables (1995) related the accumulation effects of an RIA to "investment diversion" and "investment creation." As RIAs affect factor prices in member and nonmember countries, the production shifts that result from RIAs under imperfect competition will increase demand for capital in member nations and lower it in nonmember nations, with additional capital generating permanent changes in output and income (Baldwin 1989). Mechanisms for long-run growth

[11] If RIAs include large countries, then the welfare results depend not only on trade flows and the creation or diversion of trade but also on changes in terms of trade. With imperfect competition, the welfare effects of an RIA may be many times larger than in the case of perfect competition, due to production shifting, with the RIA attracting more production as a result of the increased varieties of a differentiated good being produced (Baldwin and Venables 1995) Welfare also increases due to procompetitive effects of the RIA when scale and cost effects are significant.

effects arise from technological spillovers, given that an RIA might promote the volume of spillovers between members, either as a consequence of increased trade volumes or because of policies designed to encourage scientific interchange. Another mechanism that could result in increased long-run growth is when RIAs affect the efficiency of sectors that produce factors such as knowledge or capital goods (Baldwin and Venables 1995).

The location effect of RIAs refers to the agglomeration and location of firms and to labor migration, which could result in increased inequality between regions. According to Baldwin and Venables (1995), under perfect competition, integration is expected to equalize factor prices if the prices of goods are equalized in the integrated space. If, on the other hand, firms operate under increasing returns to scale, firms will not have incentives to locate production in every country, and this may widen, not reduce, factor price differences.

As a response to the wave of regionalism of the past 20 years, a solid body of work analyzing the effects of RIAs has been created (Panagariya 2000). This work mainly focused on the analysis of static welfare effects (Panagariya 1999). As a result, a vast literature and well-developed methods now exist to analyze these issues. Three main distinctive methodological approaches can be found in the HOS framework: revealed comparative advantage (RCA) indicators, econometric evaluations, and computable general equilibrium (CGE) evaluations.

Since first being proposed by Balassa (1965), RCA indicators derived from current production and trading patterns have been used frequently to predict the sectoral effects of trade liberalization (Barry and Hannan 2001). The measure proposed by Balassa implies that a country's pattern of comparative advantage could be observed from post-trade data, assuming that actual trade "reflects relative costs as well as differences in non-price factors" and is grounded in conventional trade theory. An RCA index measures a country's trade in a commodity relative to its total trade and to the corresponding export performance of a set of countries.

The original RCA index developed by Balassa referred only to exports. However, several alternative options have since been developed. Vollrath (1991) surveyed and compared alternative RCA indices, discussing their main advantages and disadvantages. The European Commission used RCA indices and RCA-related indices to assess the sectoral effects of the development of the single market, which, in turn, influenced their assessment of how the gains and losses would be distributed across member states. They then used this approach to assess the consequences of an expansion of EU trade with Central and Eastern Europe (CEE) (European Commission 1994). Several studies have also used this approach directly or indirectly with other approaches.

The second approach is the use of ex-post econometric studies of RIAs to measure the extent of trade creation and trade diversion. Typically, this approach econometrically estimates the so-called "gravity equation," which represents bilateral trade flows as a function of incomes and populations of trading partners, distance between them, and membership in common regional arrangements (Panagariya 2000). Because the determinants of trade between countries are clearly more complicated, gravity models generally also control for other potential influences on trade flows, such as common borders, past colonial relations, common languages, and other measures of cultural proximity, as well as the presence of any form of preferential economic arrangements. If, when trade is regressed against a collection of such variables, the presence of a trade deal has a statistically significant effect, then the presumption is that the deal has in fact altered trade flows (see, e.g., Frankel 1997)

Finally, a third approach used in the literature is to conduct ex-ante counterfactual analyses, based on partial or general equilibrium models, assuming a certain model structure, specific parameters, and functional forms to represent the participating economies explicitly in the base year. The model is then shocked to simulate the preferential removal of tariffs, and welfare effects are calculated (Panagariya 2000). According to Baldwin and Venables (1995), these models have made two contributions to the evaluation of RIAs. First, they have been used to provide estimates of the effects of actual or proposed RIAs. Second, they have helped to understand theoretical interactions in models that are too complicated to study analytically. Baldwin and Venables also discussed the contribution of different generations of these models, mainly the ones by Deardorff and Stern (1986), Harris and Cox (1984), and Harrison,

Rutherford, and Tarr (1994). The study of the North American Free Trade Agreement and the European Community (EC 92) has also shown the range of possible effects that can be captured and the predictions that can be generated in such models (see, e.g., Francois and Shields 1994).

Other methods and approaches have also been used to analyze the accumulation and allocation effects of RIAs. For example, growth regressions have been used to analyze growth models, including dummies or proxies for regional integration; results tentatively suggest that some RIAs have had positive impacts on growth. According to Baldwin and Venables (1995), this literature is not mature yet, and new conclusions may emerge.

A new literature grouped under the term *new regionalism* emphasizes incorporating the impact of forces that go beyond the stimulation of efficiency gains. This literature observes that efficiency gains are small in relation to national product and do not suffice to explain economic growth from trade. As discussed in Burfisher, Robinson, and Thierfelder (2003), this body of work is more eclectic than work in the Viner-Meade frameworks and uses partial and CGE models incorporating a variety of new elements, including rent seeking, political economy, game theory, industrial organization, geography, open-economy macroeconomics, and new growth theory. There is also an active literature seeking to understand the links between productivity and trade (see Burfisher, Robinson, and Thierfelder 2003 and Lawrence 1996).

Our study employs an ex-ante counterfactual analysis of regional trade liberalization in SADC using a partial equilibrium approach based on the HOS conceptual framework. We found this approach to be best suited to dealing with highly disaggregated trade data as used in our study. In the rest of this section, we develop the conceptual framework and the specific methodology used in our analysis.[12]

Conceptual Framework

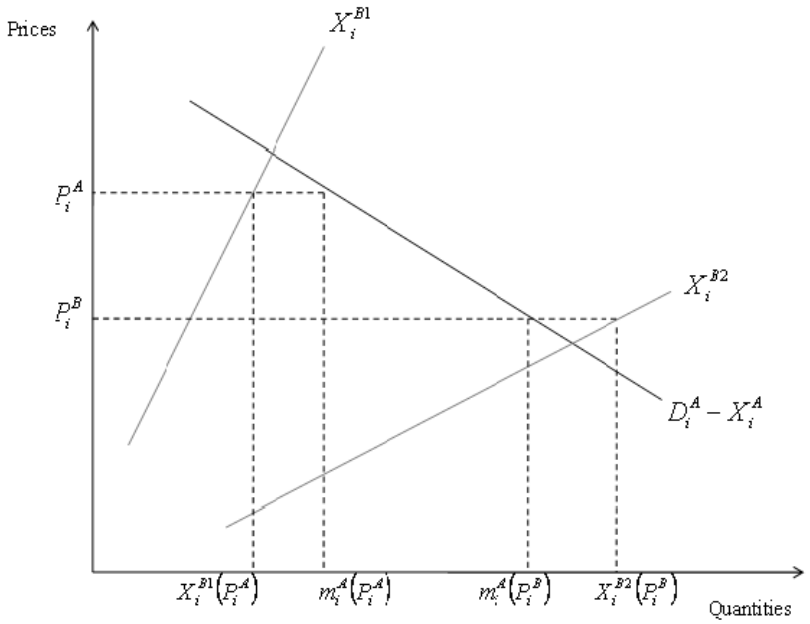
We adopt Grossman and Helpman's (1995) framework, in particular the adaptation of their framework by Vaillant and Ons (2003). We present this framework for two small economies (A and B), which could represent, respectively, regional import and export markets. We assume that all goods are produced with constant returns to scale, that industries use labor and a sector-specific factor, and that there are fixed endowments of all specific factors. Consumers within each economy have identical preferences, which are represented by a quasi-linear utility function. Because the economy is small, world prices are given exogenously. Without loss of generality, all international prices (P_i^*) are normalized to 1, while domestic prices in country Z are equal to $P_i^Z = P_i^*\left(1 + t_i^Z\right)$, the international price increased by an ad valorem tariff. Initially, the most favored nation (MNF) principle holds.

To analyze the impact of opening trade of commodity ***i*** as part of an FTA between importing country A and exporting country B, the key variables are the value of imports to A, supply and exports from B, and the import tariffs applied to trade of ***i*** in both countries. We assume that country B is an efficient producer of commodity ***i***, or at least is a more efficient producer than A, which means that domestic prices of good ***i*** in A and B are $P_i^A > P_i^B \geq 1$, with $P_i^B = 1$ if B is an efficient exporter of good ***i***.

[12] In partial equilibrium, the analysis of price changes in a particular market assumes that prices of all other goods remain constant. It must be noticed that a limitation of our approach is that for some of the industries analyzed, this assumption might not hold. A general equilibrium framework accounting for these interactions (e.g., a CGE model) is needed to capture the full effect of trade liberalization. While global and regional CGE models have been widely used in FTA analysis in the region (including many analyses conducted by the authors themselves, e.g., Nin Pratt and Diao 2008; Diao, Roe, and Somwaru 2002; Diao and Somwaru 2001), data needed to build these models are constrained by the availability of input-output data for the different sectors in different countries. These data at the sector level are much more aggregated than the industry level (four-digit SITC) used in this study, which implies that it is not possible with present data availability to analyze FTA effects using a CGE model at the detail (actual) industry level as we do here.

Figure 1 shows the demand for imports by country A and two different total supply curves for country B.[13] The location of B's supply depends on the endowment of the specific factor used by B to produce ***i***. If B's production capacity is small, then total supply of ***i*** from country B is represented by X_i^{B1}. In this case, total supply from B at price p_i^A $\left(X_i^B\left(p_i^A\right)\right)$ is not enough to satisfy A's import demand at that price $\left(m_i^A\left(p_i^A\right)\right)$. The opposite extreme case is that the specific endowment in B is so large that country B's supply of *i* $\left(X_i^B\left(p_i^B\right)\right)$ can satisfy A's import demand at the lower price p_i^B and still export to the rest of the world. In this case, B's supply response is represented by the curve X_i^{B2}; the price in importer A's market is now reduced to the price in B (p_i^B), total imports in A are $\left(m_i^A\left(p_i^B\right)\right)$, and total exports in B are $\left(X_i^{B2}\left(p_i^B\right)\right)$.

Figure 1. Effects of a regional trade agreement



It is worth noticing that if both countries export good ***i*** in the initial equilibrium, or if country A imposes no tariff on imports of good ***i*** while B is an efficient exporter, then domestic prices will be similar to the international price in both countries. Thus, the trade agreement would have no effect on production, consumption, or bilateral trade. The relevant cases are then given by those products that are initially imported by at least one of the countries subject to a most favored nation (MFN) tariff rate different from zero (sensitive commodities). If this is the case, and as stressed by Grossman and Helpman (1995), depending on the size of B's potential output, the marginal product produced in B might be sold in A's protected market, in B's less protected market, or on the world market, with prices for producers and consumers in A and B varying accordingly.

[13] Notice that this is not export supply but total supply of industry ***i*** of country B.

Three different outcomes from integration could result in this market, depending on the relative size of aggregate supply of ***i*** in country B and of import demand of ***i*** in country A. Grossman and Helpman (1995) referred to these results as follows:

- enhanced protection
- reduced protection
- the intermediate case

We briefly discuss the first two cases and the implications of each for each country/region (Figure 1). The intermediate case results are a combination of the effects of the two extreme cases and will not be discussed here (see Vaillant and Ons 2003).

Reduced protection

Supply in country B (X_i^{B1} in Figure 1) at the lowest initial price P_i^B can satisfy all of country A's import demand, $X_i^B(P_i^B) > m_i^A(P_i^B)$. Under a trade agreement, country A stops importing from the rest of the world (ROW), and its domestic price falls to P_i^B. The producers in A enjoy less protection under the trade agreement than in the initial equilibrium. Producers in B are the only foreign suppliers in A's market, and they also satisfy at least a part of A's domestic market. The price paid by consumers in B for good ***i*** and the price obtained by producers in B remains unchanged at the level P_i^B.

Enhanced protection

An RIA results in enhanced protection for the exporter when supply of country B is small with respect to demand in country A, as a result of a relatively small endowment of the specific factor in B (supply X_i^{B1} in Figure 1). At the initial price in A (P_i^A), the aggregate supply from country B is not enough to satisfy all the import demand of country A—$X_i^B(P_i^A) < m_i^A(P_i^A)$. Therefore, under an eventual RIA, country A must continue importing from the rest of the world, and its domestic price will remain unchanged. Given that $P_i^A > P_i^B$, producers in B divert all their production to A's market, while consumers in B have to satisfy all their demand by purchasing from the rest of the world at the initial price. The only effect of the RIA in this case is an increase in those prices paid to producers in the more efficient country. This results in enhanced protection for producers in country B.

Trade diversion and trade creation

The classification of those industries that show reduced or enhanced protection is directly related to the welfare results of the FTA, according to the definitions of trade creation and trade diversion discussed above. These effects are graphically presented in Figures 2 and 3.

Figure 2 shows the welfare changes in an importing country (A) and an exporting country (B) in the case of reduced protection and an inefficient exporter. When A eliminates tariffs imposed on regional exporter B, consumers in A import from B instead of from the rest of the world, because now they pay P_i^B for product ***i*** instead of P_i^A (with $P_i^A > P_i^B$). With lower domestic prices, producers in A lose area ***a***; consumers' surplus increases by area ***a + b + c + d***, but area ***e*** corresponds to a loss for consumers in tariff revenue given that all imports come from B. Because production from B is now being exported to A, country B imports from the rest of the world at price P^B to meet its domestic demand.

Consumers in country B gain tariff revenue ***f*** as a result of these imports. Given that ***f > e*** (***e*** is only a fraction of ***f***), the region as a whole gains unambiguously. Exporters in B also gain. However, results in the importing country depend on the relative size of areas ***e*** (trade diversion) and ***b + d*** (trade creation), which means that if regional exporters in industry *i* are inefficient, then the results for the importing country are ambiguous. If trade creation is bigger than trade diversion (***e < b + d***), then consumers in A benefit from the FTA. Figure 2 can also be used to show the case of an efficient regional exporter. In this case, $P_i^B = P_i^*$, which results in ***f = e = 0*** and areas ***b***, ***c***, and ***d*** being bigger than in the previous case. Now consumers in importing country A unambiguously gain, while exporting country B is not affected by the FTA.

Figure 2. Supply and demand curves in importing and exporting countries in the case of an RTA resulting in reduced protection

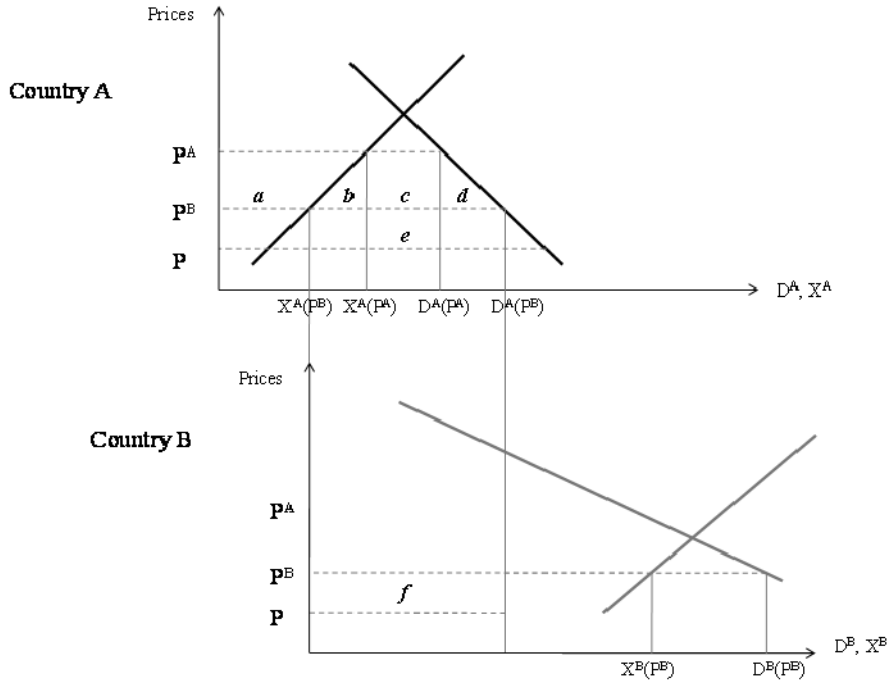
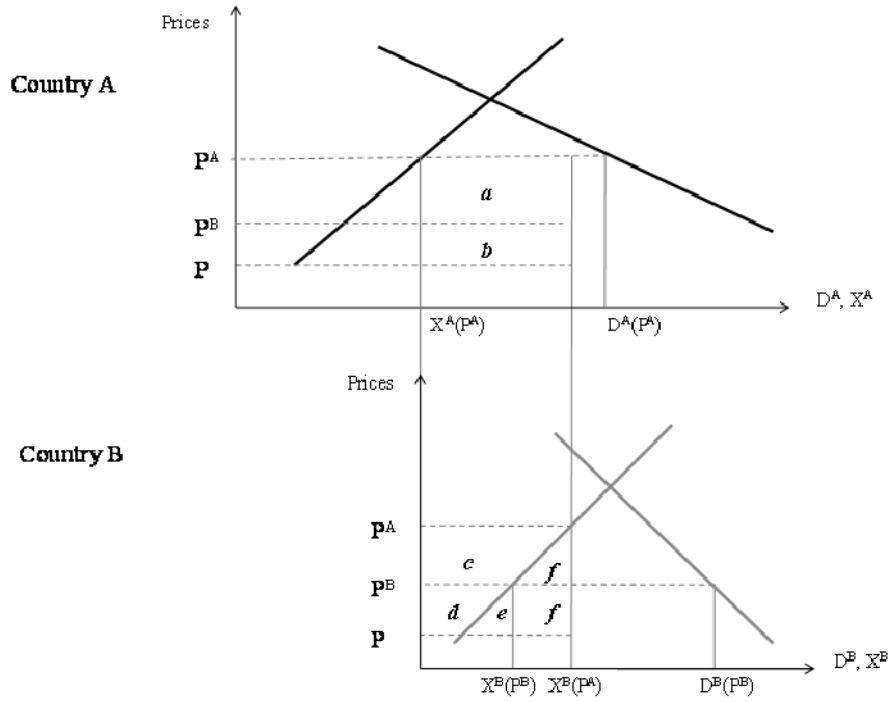


Figure 3. Supply and demand curves in importing and exporting countries in the case of an RTA resulting in enhanced protection



If the FTA results in enhanced protection for industry ***i***, then the region as a whole and consumers in the importing country unambiguously lose, while producers in exporting countries unambiguously benefit. Producers in the importing country are not affected, whereas consumers in exporting countries could gain. Figure 3 presents the case of enhanced protection with an inefficient regional producer. This is the case when import demand is larger than total supply in the exporting region. Elimination of tariffs imposed by A results in increased imports from B, though in this case production in B cannot supply total import demand in A. As a consequence, country A still imports from the rest of the world, imposing a tariff; because of this, domestic price in A after trade liberalization is still P_i^A. Consumers in country A lose tariff revenue ***a + b***, because no tariff is collected from the FTA partner. Exporters in B increase surplus by area ***c***, while consumers gain from tariff revenue ***d*** from increased imports from the rest of the world, as domestic production now goes to country A. Total gains in country B result from adding gains in consumer and producer surplus ***c + d + e***. Because ***a + b = c + d + e + f***, net loss for the region is equal to area ***f***. In the case of an efficient producer ($P^B = P$), the loss in country A is the same as before; this does not depend on the level of protection in B but only on the level of its own tariff. All gains in country B go to producers (***c + d***), given that there is no tariff revenue for consumers. The loss for the region as a whole is bigger than in the case of the inefficient exporter, corresponding to area ***e + f***.

In sum, depending on the relative size of import demand in the importing country and total supply in the exporting country, and assuming that the exporter is an efficient producer and the importer is inefficient and imposes a tariff on imports of product ***i*** before the agreement, we can have the three situations summarized in Table 11. The total effect on the region of the different cases shows that enhanced protection results in unambiguously negative impacts for the region as a whole. On the other hand, reduced protection unambiguously results in trade creation with positive effects on the region as a whole.[14]

As results in the next section show, most import markets in the region appear to be small as compared with supply from the region. This means that sensitive industries are in peril for most countries. In addition, with reduced protection under regional trade liberalization, importing countries would reduce domestic production of these industries.

Table 11. Summary of regional welfare effects of a trade agreement

Country	Consumers	Producers	Total country	Region
Enhanced protection				Negative
A (importer)	Negative	Nil	Negative	
B (exporter)	Positive	Positive	Positive	
Reduced protection				Positive
A (importer)	Positive	Negative	Positive	
B (exporter)	Nil	Nil	Nil	
Intermediate				Ambiguous
A (importer)	Ambiguous	Negative	Ambiguous	
B (exporter)	Nil	Positive	Positive	

Source: Adapted from Vaillant and Ons (2003).

[14] As discussed in Vaillant and Ons (2003), in each of the three cases presented above, we can have two different situations, depending on exporter B being an efficient exporter or a less inefficient producer than importer A. In both situations, the general conclusions for the three cases are almost the same. Some differences result from the application of a tariff by the relatively more efficient country B.

This framework allows us to determine the welfare effects of the trade agreement on consumers and producers in different countries, on importing and exporting countries, and on the region as a whole.

Methodology

In this section, we present the methodology, which is based on the conceptual framework presented above, used in this study to define a list of sensitive agricultural industries for SADC countries. These industries could be affected by regional trade liberalization. We also present elements to identify within this list; two different groups of industries, one defensive and one expansive; and the measure of welfare effects of an FTA in SADC.

The methodology involves three steps. The first step is to identify the industries in which the greatest contractive or expansive adjustments are expected due to the FTA. This means we identified two groups of industries—those with high trade complementarity using measures of revealed comparative advantage (RCA) and those with high trade complementarity using revealed comparative disadvantage (RCD). In the second step, we identify the sensitive industries within the group of complementary industries using information on tariffs for industries in the different countries. In the final step, we classify industries according to the impact of the elimination of tariffs on domestic prices in importing countries and on export prices in exporting countries (reduced protection, enhanced protection, and intermediate), based on the protection regimes discussed in the conceptual framework.

In the first step, we estimate indices of RCA and RCD for each industry in each country and determine the set of industries showing high complementarity. The RCA measure proposed by Balassa (1965) implies that a country's pattern of comparative advantage could be observed from post-trade data, assuming that actual trade "reflects relative costs as well as differences in non-price factors" and is grounded in conventional trade theory. Because the focus is on trade between SADC countries, the reference (R) used to determine comparative advantage and disadvantage is the group of SADC countries; so our measure refers to advantages and disadvantages relative to the region (see the Appendix for more details on the estimation of the RCA and RCD indexes).

One of the problems with using RCA indices, as pointed out by Balassa (1965), is that observed trade patterns can be distorted by government policies and interventions and may therefore misrepresent underlying comparative advantage. This means that policies in place in southern African countries might distort indices of revealed comparative advantage, thus affecting our results. In the case of agriculture, this concern is a global phenomenon that also exists in regions outside Africa, in particular in high-income countries and regions (e.g., EU, Japan), where the levels of distortions in agriculture are high. In the case of Africa, Yeats (1988) cautioned that application of the RCA concept should "acknowledge the influence of major distortions that are characteristics of their trade regimes." Although this was true in the 1970s and 1980s, however, recent evidence shows that policy distortions affecting agriculture have been substantially reduced in Africa in recent years (see, e.g., Nin Pratt and Yu 2008); this is particularly true among SADC countries, as discussed in Section 1. Thus, it is reasonable to state that the use of the RCA index today would be less questionable than when it was first used in the 1960s and 1970s. Therefore, the RCA index has been used extensively in recent literature analyzing trade of high-income and developing countries, including African countries (see, e.g., Hidalgo et al. 2007; Hausmann and Klinger 2006).

Adapted from Balassa's (1965) metric to measure trade complementarity between two countries, we use a metric at the industry level and apply it to measure trade complementarity between countries in different agricultural industries. The set of agricultural industries showing trade complementarity in SADC is defined as the set of industries for which at least one SADC country shows a comparative advantage (RCA > 1) and, at the same time, at least one other SADC country shows a comparative disadvantage (RCD > 1). As discussed in Vaillant and Ons (2003), industries with high complementarity have a better chance of exploiting the eventual improvement in access to the new partner's market. We expect that industries within this group will experience the greatest adjustments.

In the second step, we identify the group of "sensitive" industries.[15] As in Vaillant and Ons (2003), we consider sensitive industries to be those showing trade complementarity for which the exporting country faces an ad valorem tariff different from zero in regional markets. Thus, sensitive products are those that show trade complementarity between SADC countries and that would gain improved conditions of access to the new partner market as a result of setting up a free trade area. On the other hand, complementary industries are not sensitive if suppliers currently face a zero tariff.

In the last step, we determine which of the sensitive products constitute trade opportunities and perils for the different SADC countries. We focus in particular on the opportunities and threats that low-income countries face in contrast to those faced by middle-income countries. To do this, we refer to our conceptual framework, in which industries with reduced or enhanced protection and intermediate industries are defined based on the relative size of import demand $\left(m_i^A(P_i)\right)$ and supply of exporting countries $\left(P_i X_i^B(P_i)\right)$. We also use the information on initial value of imports and estimated value of imports at exporter's price, together with information on tariffs and import elasticities (Bouët et al. 2004), to estimate the welfare results of the FTA. We assume that *P*, the world price for imports of products from industry ***i***, is $P_i = 1$ and that prices in exporting region A and importing region B are, respectively, $P_i^A = 1 + t_i^A$ and $P_i^B = 1 + t_i^B$, where t_i is an ad valorem tariff. Value of imports after FTA is then calculated using these prices and import elasticities. With prices, trade data to represent current trade value, and information on current supply, the areas under the demand and supply curves in Figure 2 for all reduced protection industries in all countries can be quantitatively measured. The Appendix includes a detailed explanation of how the different groups of industries are defined.

The same UN Comtrade data set used in the previous two sections is used here; data on tariffs is from Bouët et al. (2004).[16] The import demand elasticities (ε_i^A) used to calculate imports at exporter price were estimated by Broda, Greenfield, and Weinstein (2006), who reported three-digit elasticities for 73 countries, estimated using six-digit harmonized system (HS) import data (1992 classification system) from the UN Comtrade database from 1994 to 2003. Information was available for three SADC countries: Madagascar, Malawi, and Mauritius. The information from Madagascar and Malawi was used to define elasticity values for low-income countries, and the information from Mauritius was used to define elasticities for middle-income countries. Detailed information on these elasticities and the criteria used to define elasticities for different countries are discussed in the Appendix.

[15] This should not be confused with a list of sensitive products in the way used in World Trade Organization negotiation and trade agreements, where "sensitive" refers to products or industries that are not subject to full disciplines by mutual agreement. From this aspect, the actual list of sensitive products is often country specific and considers several factors, including political factors and particular interests of different groups. In this study, we define sensitive products as only considering whether the tariff removal under the regional agreement may negatively affect production of that particular industry.

[16] The elasticity database was developed by Bouët et al. (2004) at the six-digit harmonized system (HS) classification. The elasticities were mapped to four-digit SITC to make them compatible with the trade data used in this study.

5. INTRA-SADC AGRICULTURAL TRADE POTENTIAL AND WELFARE IMPACT OF AN FTA

In Sections 2 and 3, we analyzed the structure of SADC agricultural exports and imports in terms of major commodities and markets. The analysis focused on both individual SADC countries and the region as a whole. In this section, we focus on the other questions addressed by this paper: What potential is there to expand intra-SADC agricultural trade? What welfare gains or losses will the FTA distribute among countries and industries? The assessment of these questions will be helpful to regional organizations and individual countries in gaining a better understanding of the potential gains of further regional integration through a customs union.

As explained in Section 4, we first need to estimate the revealed comparative advantage (RCA) and disadvantage (RCD) for all countries and industries. We then match the lists of industries with RCA > 1 and RCD > 1 to create a new list of industries that includes the intersection of these two sets—that is, commodities that simultaneously appear in the list of industries with RCA and industries with RCD. This is the set of industries with trade complementarity in SADC. From this group of industries, we separate those with import tariffs greater than zero ($t_i^d > 0$), which we call *sensitive industries*. Using import values, import elasticities, and import prices (see Section 4), we simulate a full instantaneous removal of tariff barriers among SADC countries and determine the group of sensitive industries facing reduced protection, the group of industries with enhanced protection, and any intermediate cases.[17] We then use this classification of agricultural industries to analyze the region's potential to expand agricultural trade and the opportunities and challenges faced by consumers and producers.

Regional- and Country-Level Impacts of an FTA on Agriculture

In Tables 12 (imports) and 13 (exports), we summarize the general results of the analysis. For each group of industries in these tables, we present the share of that group in total agricultural imports or exports, the number of import or export industries in each country, and the average tariff imposed by countries on imports or average tariffs faced by exporters.

The first group includes total agricultural imports (Table 12) and total agricultural exports (Table 13) for each SADC country. Total imports account for US$6.5 billion and exports for US$10 billion. SADC countries trade products from a total of 193 four-digit SITC industries. From the total set of importing and exporting industries, we identify the number of industries showing strong trade complementarity in the region, those industries for which at least one SADC country has an RCA, and those industries for which at least one SADC country shows an RCD. We found trade complementarity in 106 industries, representing 40 percent of total imports and 29 percent of exports. The average tariff on imports of complementary industries for the region is 10.7 percent, while countries exporting these products face an average tariff in regional markets of 16.2 percent.

The most important group for analyzing the impact of an FTA among SADC countries is the group of sensitive industries. The share of imports and exports of these industries in total regional imports and exports is below 30 percent, with imports showing an average tariff of 14.5 percent. Most of the sensitive industries will see reduced protection; opportunities for enhanced protection for exporting countries are small and are related to 12 industries with total imports of US$143 million and exports of only US$43 million.

[17] Our study analyzes the impact of a trade agreement under the extreme case of full instantaneous removal of tariff barriers. In practice, FTA negotiations often call for a gradual tariff reduction and removal such that protected industries could potentially adjust. This is particularly true for the sensitive products, as they are often excluded from the agreement or they enjoy much longer delayed period of implementation. Acknowledging this policy process, we expect the analytic results of this study to capture the directions of change and welfare impacts of the trade liberalization process.

Table 12. Value of agricultural imports and classification of agricultural industries of SADC countries in industries with trade complementarity, sensitive industries, and protection regimes resulting from an FTA

		Angola	DRC	Madagascar	Malawi	Mauritius	Mozambique	Tanzania	Zambia	Zimbabwe	SACU	Total
Total imports	Value (millions US$)	884	223	216	144	600	309	320	162	263	3,333	6,454
	Share agricultural imports (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	N of industries	182	177	174	187	190	187	191	189	185	193	193
	Tariff (%)	10.1	7.0	1.8	3.7	6.5	6.5	8.8	5.5	5.5	9.2	8.5
Trade complement-arity	Value (millions US$)	511	88	142	52	276	149	79	60	122	1,087	2,567
	Share Ag imports (%)	57.9	39.8	66.8	36.5	45.9	48.2	24.8	37.3	46.8	33.9	40.6
	N of industries	30	28	33	28	26	36	19	27	27	99	106
	Tariff (%)	16.9	15.1	2.1	6.8	9.6	10.1	22.1	8.5	22.0	7.2	10.7
Sensitive industries	Value (millions US$)	511	88	50	32	84	149	79	58	121	543	1,713
	Share Ag imports (%)	57.9	39.5	23.3	22.6	14.0	48.2	24.5	35.8	46.2	16.9	27.1
	N of industries	30	27	12	24	18	36	13	25	26	55	85
	Tariff (%)	16.9	15.1	6.1	11.0	31.4	10.1	22.3	8.9	22.3	9.4	14.5
Reduced protection[1]	Value (millions US$)	462	78	48	28	82	142	119	67	52	491	1,570
	Share Ag imports (%)	52.3	35.3	22.6	19.7	13.6	46.2	37.2	41.8	19.7	15.3	24.8
	N of industries	25	23	11	21	17	31	11	23	25	49	73
	Tariff (%)	17.7	15.1	6.2	11.0	31.8	10.3	24.3	9.4	22.4	9.6	12.0
Enhanced & intermediate protection[1]	Value (millions US$)	49	9	1	4	2	6	2	11	6	52	143
	Share Ag imports (%)	5.6	4.2	0.7	2.8	0.4	2.0	0.5	6.9	2.4	1.6	2.3
	N of industries	5	4	1	3	1	5	2	2	1	6	12
	Tariff (%)	8.8	15.3	4.7	11.2	15.5	5.0	10.0	5.6	13.6	11.8	10.5

Note:

1. Industries with reduced protection are those threatened by the FTA, with domestic production in importing countries displaced by imports while not affecting production in exporting countries. Industries with enhanced protection are those in exporting countries that find opportunities to increase production as a result of an increase in prices paid for their exports to regional markets.

Source: Authors' calculation based on UN Comtrade data and tariff data from Bouët et al. (2004).

Table 13. Value of agricultural exports and classification of agricultural industries of SADC countries in industries with trade complementarity, sensitive industries, and protection regimes resulting from an FTA

		Angola	DRC	Madagascar	Malawi	Mauritius	Mozambique	Tanzania	Zambia	Zimbabwe	SACU	Total
Total exports	Value (millions US$)	40	79	573	488	498	312	717	271	1,081	6,069	10,128
	Share agricultural exports (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	N of industries	100	118	155	144	166	155	187	161	182	193	193
	Tariff (%)[(a)]	1.1	2.1	4.4	4.7	13.1	3.0	4.3	9.5	6.1	8.0	7.2
Trade complementarity	Value (millions US$)	1	20	280	130	349	48	314	170	453	1,440	3,205
	Share Ag exports (%)	2.3	27.1	49.1	26.8	70.3	15.7	43.8	63.8	42.1	21.1	31.3
	N of industries	3	5	27	28	22	15	57	20	48	78	106
	Tariff (%)[(a)]	5.1	1.6	16.5	16.7	13.5	9.5	8.6	8.3	11.9	21.1	16.2
Sensitive industries	Value (millions US$)	0	19	259	130	331	46	286	140	437	1,417	3,067
	Share Ag exports (%)	1.0	25.8	45.6	26.8	66.7	15.1	40.0	52.7	40.6	20.8	28.3
	N of industries	2	4	20	27	19	12	44	17	42	67	85
	Tariff (%)[(a)]	11.9	2.5	17.9	17.1	14.3	12.2	10.5	12.0	13.6	22.1	17.7
Reduced protection[1]	Value (millions US$)	0	14	251	130	330	46	281	140	424	1,407	3,024
	Share Ag exports (%)	0.9	19.2	44.1	26.8	66.5	15.1	39.2	52.7	39.3	20.6	27.9
	N of industries	1	3	15	24	15	11	39	17	38	58	73
	Tariff (%)[(2)]	12.0	2.5	18.0	16.9	13.3	12.8	10.5	11.8	13.6	22.1	17.6
Enhanced & intermediate protection[1]	Value (millions US$)	0	5	9	0	1	0	5	—	13	9	43
	Share Ag exports (%)	0.1	6.5	1.5	0.0	0.2	0.0	0.7	0.0	1.2	0.1	0.4
	N of industries	1	1	5	3	4	1	5	0	4	9	12
	Tariff (%)[2]	1.2	4.4	4.4	3.9	9.7	1.2	4.2	0.0	12.0	13.7	8.9

Notes:

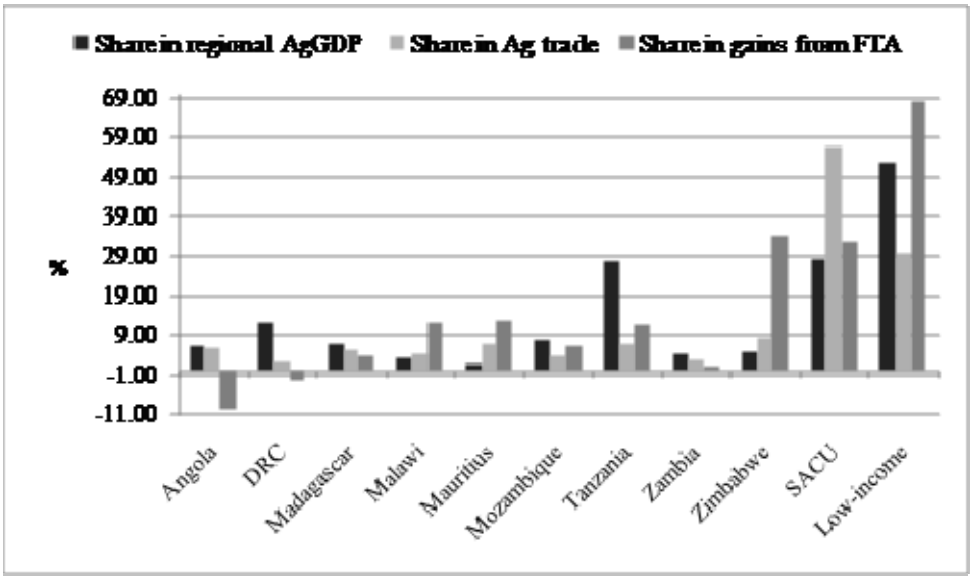
1. Industries with reduced protection are those threatened by the FTA, with domestic production in importing countries displaced by imports while not affecting production in exporting countries. Industries with enhanced protection are those in exporting countries that find opportunities to increase production as a result of an increase in prices paid for their exports to regional markets.

2. Average tariffs faced by exporters.

Source: Authors' calculation based on UN Comtrade data.

Aggregated results for the region indicate that the welfare impact of an FTA in the agricultural sector is positive (Figure 4). However, this benefit is small. We estimate the total value of trade creation to be US$177 million, or 1.1 percent of total agricultural trade of SADC countries. We estimate the net effect between trade creation and trade diversion to be US$129 million, or 0.75 percent of total agricultural trade. These results indicate that an FTA would not have a significant welfare effect on SADC's agriculture. At the country level, Figure 4 shows that two-thirds of the gains from agricultural trade liberalization would go to low-income countries; this amount is bigger than their contribution to regional agricultural GDP and their share in agricultural trade. Almost one-third of the gains from trade would go to the Southern African Customs Union (SACU), which is slightly above its share in regional agricultural GDP and almost half of its share in total agricultural trade. The largest gains would go to Zimbabwe, SACU, Malawi, Mauritius, and Tanzania, while the welfare of Angola and the DRC would be negatively affected by the agreement.

Figure 4. Distribution of welfare gains in agriculture between groups of countries[1] resulting from an FTA in SADC compared with countries' share in regional agricultural GDP (2005) and agricultural trade (2000–2005)



Note: 1. Low-income countries include Madagascar, Malawi, Mozambique, Tanzania, Zambia, and Zimbabwe; SACU includes Botswana, Lesotho, Namibia, South Africa, and Swaziland; trade is the sum of imports and exports

Source: Authors' calculation based on UN Comtrade data.

Country level results in Tables 12 and 13 show that Angola, the DRC, and Mozambique currently appear to have comparative disadvantages for agricultural production in the region. Angola imports US$511 million (58 percent of total agricultural imports) of products from 30 industries with high trade complementarity, while it only exports US$1 million (2.3 percent of agricultural exports) from three industries. The DRC also imports more products from industries with trade complementarity than it exports: US$88 million of imports from 20 industries compared with US$20 million of exports from five industries. The value of Mozambique's exports from industries with trade complementarity is only one-third of the value of imports in this group of industries. SACU is the major exporter and importer of products from industries with high complementarity in the region, with US$1,087 million imports and US$1,440 million exports. Other net exporters are Zimbabwe, Mauritius, Tanzania, and Madagascar.

As shown in Table 12, producers facing the most significant challenges from SADC's trade agreement are those in the group of industries with reduced protection in countries showing high tariffs, such as Mauritius, Tanzania, and Zimbabwe (average tariffs greater than 22 percent) and to a lesser degree Angola and the DRC (average tariffs of 18 and 15 percent, respectively). The agreement will

negatively affect producers in 17, 11, and 25 industries in Mauritius, Tanzania, and Zimbabwe, respectively. Angola and the DRC will see protection reduced in more than 20 industries, representing 52 and 35 percent of total agricultural imports in those countries, respectively. The effect of reduced protection on production will likely be smaller in countries such as Madagascar, Malawi, Zambia, and SACU, where average import tariffs are low (below 11 percent).

According to our results, the scope for producers to benefit from industries with enhanced protection as a result of the FTA appears to be very limited; likewise, the negative effect of trade diversion from these industries would also be very limited. Producers who could benefit from enhanced protection are those in the exporting industries in Zimbabwe, SACU, Madagascar, Tanzania, and the DRC. These benefits could be significant for producers in four industries in Zimbabwe, nine in SACU, and five in Madagascar and Tanzania (Table 13). However, the overall effect on agriculture would be small, given that these industries represent 1.2 percent or less of total exports of these countries.

Trade Complementarity

We now focus on the group of industries with high trade complementarity. As seen in Tables 12 and 13, the number of these industries and their trade specialization vary significantly among countries. The interior cells in Table 14 show the number of matches of importing and exporting industries between countries. Row totals represent the total number of matches that exports from countries in the first column find among industries imported by countries in the first row of the table. Column totals show the number of matches that imports to countries in the first row find among industries exported by countries in the first column of the table. SACU, Zimbabwe, and Tanzania are the exporters with the highest potential in the region. SACU's exports find complementary industries in all countries, with more than 40 matches in Angola, the DRC, Mauritius, and Mozambique and close to 30 matches in other countries (a total of 350 matches). Zimbabwe and Tanzania also have export opportunities in several countries, but most exporting industries in these countries have trade complementarity with SACU's import industries. The same is true for other countries exporting in the region. SACU is also the major importer, showing more matches for industries specialized in imports than in exports (524 matches in imports compared with 349 in exports). Other importers with high comparative disadvantages and a high number of matches for importing industries are Angola and the DRC.

Table 15 presents industries with regional trade complementarity. The table shows the total value of imports and exports of main industries, adding up to the totals presented in Tables 12 and 13 (US$2,567 million in imports and US$3,205 million in exports). The most important complementary industries are sugar, beverages (wine, distilled alcoholic beverages), cotton (raw, yarn), cereals (maize, rice), meat of bovine cattle, tea, coffee, cereal and milling products (meal and flour of cereals), and feed (oilseed cakes and food waste). Table 15 also shows the share of imports and exports of each industry coming from and going to the region. The share of imports coming from the region is twice as large as the share of exports going to the region (41 percent compared with 19 percent), which is partly related to the relatively small size of the regional market for agricultural products, though this varies by industry. Exports of maize, nonalcoholic beverages, rice, meal and flour of cereals, oilseed cakes, beer, milk, yarn of wool, and confectionary sugar have the region as their major destination, with more than 60 percent of total exports of those industries going to SADC countries. On the other hand, raw sugar, raw cotton, tea, and flowers are exported mainly to international markets, and they supply most of the regional import market of products from these industries. Products from industries like maize, nonalcoholic beverages, cigarettes, and milk are mainly traded in the regional market, as both regional imports and exports have high shares in total trade.

Table 14. Number of matches between importing and exporting industries with high complementarity in SADC

Exporters	Importers										Total matches exporting industries
	Ang.	DRC	Mad.	Mwi.	Mau.	Moz.	Zim.	Tnz.	Zam.	SACU	
Angola		1	1	1	2	2	1	1	1	9	19
DRC	0		1	0	1	0	1	0	1	11	15
Madagascar	4	5		3	11	9	5	5	7	53	102
Malawi	5	8	10		7	11	8	8	9	71	137
Mauritius	6	6	13	7		7	6	5	7	45	102
Mozambique	3	5	4	7	3		6	2	8	29	67
Zimbabwe	20	17	12	14	17	16		9	15	118	238
Tanzania	10	13	16	16	18	20	20		17	137	267
Zambia	5	3	5	3	8	3	8	1		51	87
SACU	54	46	33	35	43	47	31	29	31		349
Total matches importing industries	107	104	95	86	110	115	86	60	96	524	

Source: Authors' calculation based on UN Comtrade data

Trade specialization and the importance of different industries vary by group of countries. Figure 5 presents the value of imports and exports and the cumulative distribution of industries with regional trade complementarity across chapters of the SITC classification for low-income countries and SACU. Figure 5a shows that imports of low-income countries are concentrated in cereals, milling, and bakery products (chapter 04 of the SITC classification) and sugar (chapter 06). These products account for almost 80 percent of total imports for these countries. In contrast with low-income countries, SACU's imports are more diversified and are distributed across the whole range of agricultural products, from animal products to textile fibers and yarn.

Distribution of exports across products also varies by group of countries (Figure 5b). Low-income countries show a high concentration of exports in chapter 07 of SITC (coffee, tea, cocoa, and spices), but also beans, flowers, vegetables, maize, and tobacco. SACU countries export meat, cereals, sugar, cotton, tea, and wine.

Table 15. Set of industries showing trade complementarity between SADC countries

SITC code	Industry	Exports			Imports		
		Value (thousands US$)	Share in Ag exports (%)	To SADC importers (%)	Value (thousands US$)	Share in Ag imports (%)	From SADC exporters (%)
0611	Raw sugar, beet & cane	511,305	5.0	3.0	67,842	1.1	83.1
1121	Wine of fresh grapes, including grape must	470,765	4.6	1.9	58,180	0.9	13.2
2631	Raw cotton, other than linters	304,359	3.0	24.0	99,275	1.6	73.4
0440	Maize (corn), unmilled	168,453	1.6	62.4	152,705	2.4	76.4
0752	Spices, exc. pepper & pimento, ground or not	231,638	2.3	0.3	13,075	0.2	39.4
0612	Refined sugar & other products of refining, no syrup	122,078	1.2	33.8	95,919	1.5	40.3
1124	Distilled alcoholic beverages	36,735	0.4	40.7	129,463	2.0	7.4

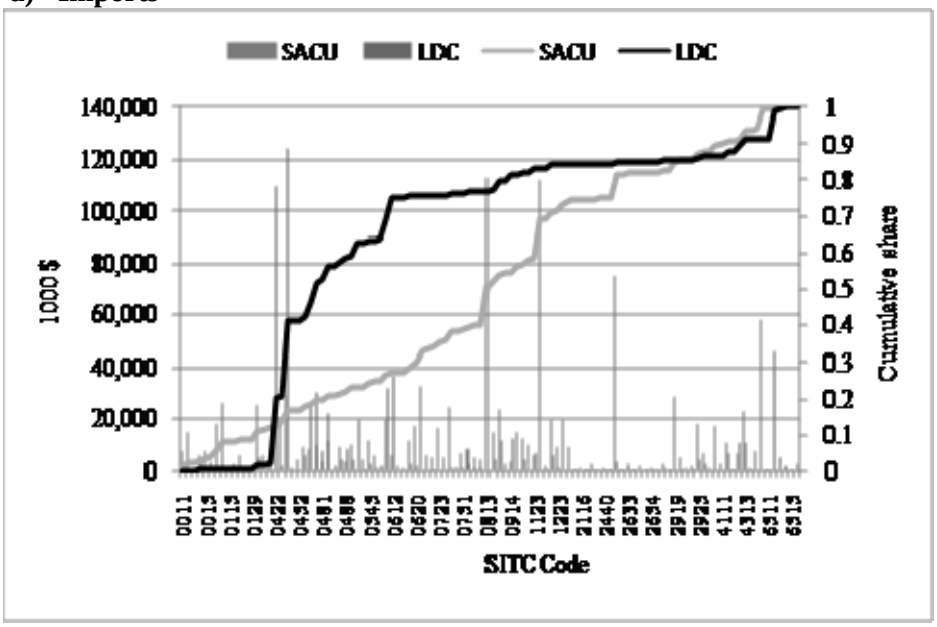
Table 15. (Continued)

SITC code	Industry	Exports			Imports		
		Value (thousands US$)	Share in Ag exports (%)	To SADC importers (%)	Value (thousands US$)	Share in Ag imports (%)	From SADC exporters (%)
0111	Meat of bovine animals, fresh, chilled, or frozen	114,139	1.1	2.1	50,757	0.8	4.6
1110	Nonalcoholic beverages, nes	72,448	0.7	70.4	73,426	1.2	72.8
6513	Cotton yarn & thread, gray, not mercerized	50,594	0.5	40.8	114,295	1.8	9.5
0422	Rice, glazed or polished, not further prepared	10,448	0.1	65.8	135,204	2.1	0.5
0711	Coffee, green or roasted	114,439	1.1	2.3	32,573	0.5	8.8
0460	Meal and flour of wheat or of meslin	20,507	0.2	69.9	113,869	1.8	20.8
0741	Tea	100,445	1.0	16.4	26,786	0.4	79.4
0470	Meal & flour of cereals exc. wheat or meslin	35,385	0.3	84.6	75,022	1.2	47.4
1222	Cigarettes	57,485	0.6	45.3	48,739	0.8	74.6
0813	Oilseed cake & meal & other veg. oil residues	7,779	0.1	69.8	112,801	1.8	3.7
1123	Beer, including ale, stout, porter	21,368	0.2	90.0	84,996	1.3	50.5
2927	Cut flowers & foliage	98,369	1.0	0.7	1,515	0.0	78.6
0819	Food wastes & prepared animal feed, nes	20,745	0.2	31.7	35,346	0.6	25.4
0542	Beans, peas, lentils & leguminous veg., dried	35,013	0.3	9.9	41,448	0.7	27.0
6114	Leather of other bovine cattle & equine leather	15,913	0.2	6.5	58,313	0.9	2.2
0484	Bakery products	23,387	0.2	44.1	40,269	0.6	25.0
0223	Milk & cream, fresh	8,855	0.1	91.1	41,209	0.7	45.2
6512	Yarn of wool & animal hair	8,448	0.1	65.5	57,431	0.9	9.1
0545	Other fresh vegetables	39,076	0.4	2.5	23,713	0.4	48.4
0482	Malt, including malt flour	9,725	0.1	95.4	44,059	0.7	32.1
0620	Sugar confectionery & other sugar preparations	6,788	0.1	87.5	34,349	0.5	37.5
0488	Preparations of cereals, flour & starch for food	11,713	0.1	42.5	34,748	0.5	12.0
0118	Other fresh, chilled, frozen meat & edible offals	37,522	0.4	0.8	5,939	0.1	5.8
	Other	438,846	4.3	20.0	664,355	10.5	23.4
	Total	3,204,768	31.3	18.7	2,567,622	40.6	31.0

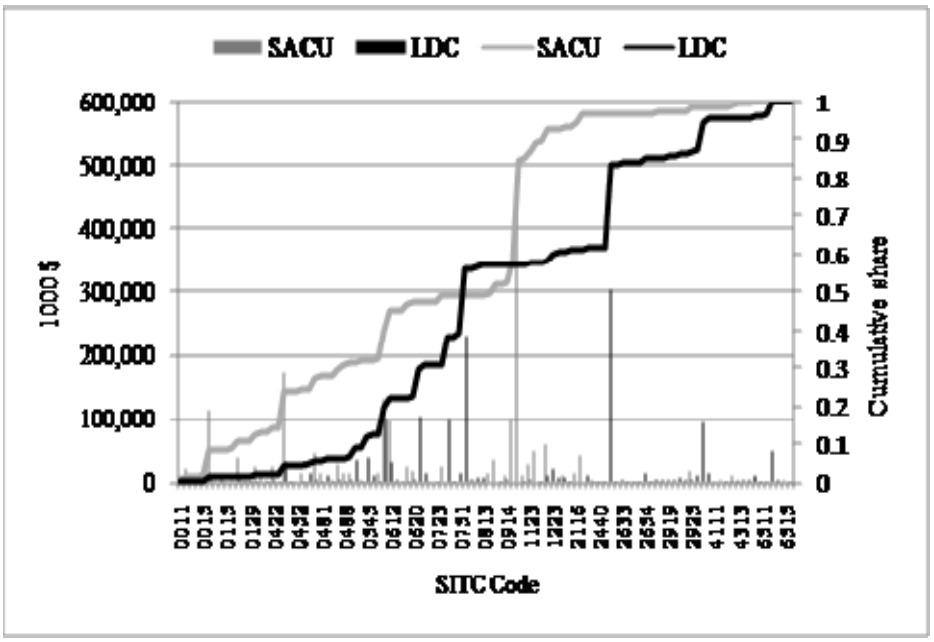
Source: Authors' calculation based on UN Comtrade data.

Figure 5. Value of imports and exports at the SITC four-digit level[1] and cumulative distribution across chapters of the SITC classification

a) Imports



b) Exports



Note: 1. Chapters of SITC with agricultural industries are (00) live animals; (01) meat; (02) dairy; (03) fish; (04) cereals, milling, and cereal preparations; (05) vegetables; (06) sugar; (07) coffee, tea, cocoa & spices; (08) feed; (11) beverages; (12) tobacco; (21) hides & skins; (26) veg. fibers; (29) veg. materials; and (43) fats, oils & waxes; as well as some industries in (61) leather and (65) yarns

Source: Authors' calculation based on UN Comtrade data.

Sensitive Industries

We found a total of 85 industries in SADC that are part of the group of industries with trade complementarity and that at the same time have tariffs greater than zero. These sensitive industries represent 27 and 28 percent of total agricultural imports and exports of SADC countries, respectively.

Table 16 presents sensitive four-digit SITC industries for the SADC region sorted by tariff. The most sensitive industries are mostly food processing industries or those industries with relatively high value added, such as cereal grains, flaked, pearled; bakery products; tomatoes, fresh; wine; beer; tobacco, manufactured; pig meat, bacon, ham; meal and flour of cereals; cigarettes; vegetables, frozen or in temporary preservative; other fresh vegetables; cigars and cheroots; refined sugar; and spices. Average tariffs for these industries are all above 20 percent.

A step below in the scale of protection (average tariffs between 15 and 20 percent), we find dairy and oil industries, including milk and cream, fresh; margarine; animal and vegetable oils; vegetable products for human food not elsewhere specified (nes); and hydrogenated oils and fats. Also in this category are beans, peas, lentils, and leguminous dried; cotton yarn; and maize, unmilled.

Given that most of the sensitive industries face reduced protection, as shown in Tables 12 and 13, we have not presented sensitive industries for different SADC countries and regions here. Instead, we present this information in the next section. Because of the very small incidence of industries with enhanced protection in our results, these industries will not be discussed. Information on them can be found in the Appendix.

Table 16. Sensitive agricultural industries sorted by tariff

SITC	Industry	Tariff (%)	Import value (thousands US$)	Import share (%)	Export value (thousands US$)	Export share (%)
0112	Meat of sheep & goats, fresh, chilled, or frozen	40.0	13,568	0.29	871	0.01
1121	Wine of fresh grapes, including grape must	35.4	46,852	1.01	470,765	4.60
1222	Cigarettes	34.8	30,421	0.66	57,485	0.56
0730	Chocolate & other food prep. of cocoa	30.3	11,524	0.25	17,212	0.17
1110	Nonalcoholic beverages, nes	30.2	58,665	1.27	72,448	0.71
1123	Beer, including ale, stout, porter	29.4	79,880	1.73	21,368	0.21
1122	Cider & fermented beverages, nes	29.0	1,507	0.03	3,608	0.04
0616	Natural honey	28.8	1,069	0.02	1,524	0.01
1223	Tobacco, manufactured for smoking, chewing, snuff	28.8	2,928	0.06	20,837	0.20
0481	Cereal grains, flaked, pearled	25.0	9,714	0.21	10,100	0.10
0544	Tomatoes, fresh	24.6	292	0.01	1,216	0.01
0742	Mate	24.0	799	0.02	894	0.01
0741	Tea	22.7	22,190	0.48	100,445	0.98
0546	Vegetables, frozen or in temporary preservative	21.4	4,615	0.10	11,873	0.12
0752	Spices, exc. pepper & pimento, ground or not	20.2	5,252	0.11	231,638	2.26
1221	Cigars & cheroots	20.2	514	0.01	594	0.01
0484	Bakery products	18.8	30,367	0.66	23,387	0.23

Table 16. (Continued)

SITC	Industry	Tariff (%)	Import value (thousands US$)	Import share (%)	Export value (thousands US$)	Export share (%)
0612	Refined sugar & other prod. of refining, no syrup	18.2	95,814	2.08	122,078	1.19
4312	Hydrogenated oils & fats	17.1	13,350	0.29	6,039	0.06
0470	Meal & flour of cereals, exc. wheat or meslin	16.2	65,945	1.43	35,385	0.35
0440	Maize (corn), unmilled	15.6	105,756	2.29	168,453	1.65
0611	Raw sugar, beet & cane	14.6	56,112	1.22	511,305	4.99
0223	Milk & cream, fresh	13.8	16,237	0.35	8,855	0.09
0914	Margarine, imitn. lard & preprd. edible fats, nes	13.2	28,543	0.62	9,936	0.10
0488	Preparations of cereals, flour & starch for food	12.9	31,477	0.68	11,713	0.11
2631	Raw cotton, other than linters	12.1	80,494	1.74	304,359	2.97
0620	Sugar confectionery & other sugar preparations	11.9	19,987	0.43	6,788	0.07
0422	Rice, glazed or polished, not further prepared	11.1	104,327	2.26	10,448	0.10
0542	Beans, peas, lentils & leguminous vege., dried	10.9	41,448	0.90	35,013	0.34
0113	Meat of swine, fresh, chilled, or frozen	10.7	31,523	0.68	2,561	0.03
0111	Meat of bovine animals, fresh, chilled, or frozen	10.0	38,146	0.83	114,139	1.11
1124	Distilled alcoholic beverages	10.0	122,749	2.66	36,735	0.36
4313	Acid oils, fatty acids & solid residues	9.9	29,742	0.64	3,050	0.03
0483	Macaroni, spaghetti, noodles, vermicelli, etc.	9.6	20,364	0.44	2,175	0.02
0460	Meal and flour of wheat or meslin	9.3	106,013	2.30	20,507	0.20
	Subtotal	16.7	1,328,185	29	2,455,802	24
	Other	6.6	385,198	8	610,825	6
	Total	14.5	1,713,384	37	3,066,628	30

Source: Authors' calculation based on UN Comtrade data.

Challenges and Opportunities of an FTA in Agriculture

We now look in detail at the sensitive industries to determine which might contract their production levels and which will find expansion opportunities as a result of eliminating trade barriers between SADC countries. As discussed in Section 4, if supply from the region can satisfy all import demand of regional import markets and if regional exporters are more efficient producers than regional importers, importers would stop importing from the rest of the world under a trade agreement and would import from the region. Under these circumstances, producers in importing countries would enjoy less protection under the trade agreement than in the initial equilibrium, and their domestic price would fall to the level of prices in regional exporters' markets. Producers in exporting countries would be the only suppliers of regional markets, and they would also satisfy at least a part of their domestic market. The price paid by consumers and the price obtained by producers in the exporting countries would remain unchanged at the initial level. This is the case of reduced protection. On the other hand, when regional import demand is large compared with regional supply, more efficient producers from the region would export to regional

import markets, but importers would still need to rely on imports from the rest of the world. Therefore, the price at the importing country would not change with the trade agreement and would be equal to the international price, plus the tariff the importing region imposes on the rest of the world. In this case, the FTA would enhance protection for regional exporters, who would benefit from the higher price they obtain in the protected regional market.

As Table 12 shows, the elimination of trade barriers between SADC countries results in reduced protection for a large majority of sensitive industries. In this section, we are interested in looking in detail at industries in different countries that would be affected by the trade agreement. Table 17 shows industries in low-income countries facing reduced protection if tariffs between SADC countries are eliminated. The table shows the tariff that each country imposes on imports of products of those industries, which gives a sense of the potential impact that the elimination of those tariffs could have in each industry and country. The higher the tariff, the higher is the expected negative impact on domestic production of that industry. Table 17 also shows total imports for the countries facing reduced protection in each industry and the share of these imports in total agricultural imports of low-income countries. Tariffs shown for industries and countries are only those above 10 percent. Industries affected represent 19 percent of all agricultural imports of these countries. On average, high tariffs in low-income countries are imposed on meat (01); beverages and tobacco (11–12); cereal and cereal preparations (04); oils, fats, and waxes (43); coffee, tea, cocoa, and spices (07); and vegetables (05). For these groups, average tariffs are above 20 percent. The levels of tariffs in other SITC chapters are between 18 percent (sugar, 06) and 14 percent (textile fibres, 26).

If we look at individual low-income countries in Table 17, we see that Mozambique and Zimbabwe have the highest number of industries with high tariffs facing reduced protection (15 and 14, respectively); Malawi, Tanzania, and Zambia have 10 industries each; while Madagascar has only 3. The structure of protection across sectors, and thus the industries facing output contraction and increased regional imports, varies by country. In the case of Mozambique, Tanzania, and Zimbabwe, industries facing reduced protection in an FTA are spread across most of the SITC chapters, but are especially concentrated in cereals, cereal preparations, live animals and meat, and vegetables. Other industries at risk in these countries are mostly those that incorporate higher value added. Mozambique, for example, shows relatively high protection on beverage and tobacco (wine, beer, cigarettes, and manufactured tobacco) and spices. In Tanzania, domestic production of raw and refined sugar is expected to shrink as a consequence of the FTA, whereas in Zimbabwe, industries facing reduced protection are animal and vegetable oils, hydrogenated oils and fats, and cotton yarn and thread.

The protection structures, and thus the industries in the group of reduced protection, are quite different in Malawi and Zambia from those in Mozabique, Tanzania, and Zimbabwe. In Zambia, the highest tariffs are imposed on other fresh and frozen vegetables; animal or vegetable oils; hydrogenated oils and fats; and cereal grains, flaked, pearled. Similarly, Malawi imposes high tariffs on oils, fats, and margarine; cigars and cigarettes; and preparation of cereals. Madagascar has the lowest agricultural protection in the region; only three industries could be affected by reduced protection—raw sugar, refined sugar, and spices, all of which have tariffs below 15 percent.

Table 18 shows industries facing reduced protection in SACU, Mauritius, Angola, and the DRC. These regions show higher average tariffs on agriculture than do low-income countries. SACU imposes tariffs on 25 industries, while protected industries in the other three countries range from 16 to 18, which is higher than in all low-income countries. In general, protection in these four countries covers most SITC chapters. SACU, the most important market in the region, shows relatively high average tariffs and highly protected industries. The industries that would be most affected by a regional trade agreement are nonalcoholic beverages and cheese and curd, with peak tariffs above 90 percent; cigarettes and the meat of sheep and goats, with tariffs above 40 percent; milk and cream, fresh, and tobacco, manufactured, with tariffs greater than 30 percent; and bakery products, natural honey, coffee, tea, cocoa, and spices, wine, and cider and fermented beverages, all with tariffs above 20 percent.

Table 17. Tariff rates (%) and shares in agricultural imports of industries facing reduced protection in low-income countries as a result of eliminating tariffs between SADC countries

STIC	Industries	Mad.	Mwi.	Moz.	Tnz.	Zam.	Zim.	Share in Ag imports
0013	Swine			15.8	16.6		18.1	0.0
0014	Poultry, live				15.1			0.0
0121	Bacon, ham & other dried, salted, smoked pig meat				25.0			0.0
0223	Milk & cream, fresh		10.2	22.8				0.4
0421	Rice in the husk or not, not further prepared				19.5			0.1
0422	Rice, glazed or polished, not further prepared				25.0			1.9
0440	Maize (corn), unmilled						23.2	4.6
0459	Cereals, unmilled, nes			16.1			14.8	0.2
0460	Meal and flour of wheat or meslin			23.2				0.4
0470	Meal & flour of cereals, exc. wheat or meslin		14.2				25.4	2.1
0481	Cereal grains, flaked, pearled		22.0	19.0		21.0	37.4	0.5
0484	Bakery products			25.0				0.2
0488	Preparations of cereals, flour & starch for food		21.9		23.3			0.3
0541	Potatoes, fresh, not including sweet potatoes						16.5	0.2
0542	Beans, peas, lentils & leguminous vege., dried		16.4	17.1		11.7	20.1	1.4
0544	Tomatoes, fresh			25.0				0.0
0545	Other fresh vegetables			22.9		23.7		0.2
0546	Vegetables, frozen or in temporary preservative					23.6		0.0
0548	Vegetable products, chiefly for human food, nes				19.3	15.2	26.0	0.1
0611	Raw sugar, beet & cane	10.4			25.0			1.1
0612	Refined sugar & other prod. of refining, no syrup	12.1			25.0			2.3
0752	Spices, exc. pepper & pimento, ground or not	15.6		25.0		22.1		0.2
0812	Bran, pollard, sharps & other by-products						15.0	0.0
0814	Meat & fish meal, unfit for human consumption						14.8	0.1
0914	Margarine, imitn. lard & preprd. edible fats, nes		20.0	25.0	24.9	17.1		0.7
1121	Wine of fresh grapes, including grape must			25.0				0.3
1123	Beer, including ale, stout, porter			25.0				0.4
1221	Cigars & cheroots		21.2					0.0
1222	Cigarettes		21.0	25.0				0.4
1223	Tobacco, manufactured for smoking, chewing, snuff			25.0				0.1
2119	Hides & skins, nes						13.0	0.0
2640	Jute & waste					14.3		0.0
4311	Anim./veg. oils, boiled, oxidized, dehydrated		23.6			23.1	12.4	0.0
4312	Hydrogenated oils and fats		23.6			23.5	27.2	0.5
6514	Cotton yarn & thread, bleached, dyed, mercerd.						16.0	0.0
	Subtotal							18.9
	Other							13.6
	Total							32.5

Source: Authors' calculation based on UN Comtrade data.

Table 18. Tariff rates (%) and shares in agricultural imports of industries facing reduced protection in other countries as a result of eliminating tariffs between SADC countries

SITC	Industries	Angola	DRC	Mauritius	SACU	Share in total Ag imports
0015	Horses, asses, mules & hinnies			12.6		0.0
0111	Meat of bovine animals, fresh, chilled, or frozen	10.0			39.8	0.8
0112	Meat of sheep & goats, fresh, chilled, or frozen				40.0	0.3
0113	Meat of swine, fresh, chilled, or frozen	10.0	10.0		10.9	0.6
0121	Bacon, ham & other dried, salted, smoked pig meat	10.0			14.9	0.1
0223	Milk & cream, fresh			25.0	34.1	0.1
0240	Cheese & curd		20.0		94.7	0.0
0460	Meal & flour of wheat or meslin	10.0	10.0			1.6
0470	Meal & flour of cereals, exc. wheat or meslin	10.0	10.0			0.7
0481	Cereal grains, flaked, pearled		14.5	20.0	15.6	0.1
0484	Bakery products	10.0	20.0	40.1	21.8	0.6
0488	Preparations of cereals, flour & starch for food	10.0	18.3	11.6	17.7	0.5
0544	Tomatoes, fresh				15.0	0.0
0545	Other fresh vegetables		10.0	14.4	18.2	0.1
0546	Vegetables, frozen or in temporary preservative		10.2	33.9	17.6	0.0
0611	Raw sugar, beet & cane		20.0		16.9	0.5
0612	Refined sugar & other prod. of refining, no syrup		20.0	78.0	16.4	0.3
0616	Natural honey			61.4	22.0	0.0
0730	Chocolate & other food prep. of cocoa	10.0	20.0	51.5	18.2	0.2
0741	Tea		20.0		23.5	0.4
0752	Spices, exc. pepper & pimento, ground or not			20.7		0.0
0914	Margarine, imitn. lard & preprd. edible fats, nes		20.0	15.0		0.1
1110	Nonalcoholic beverages, nes	30.0			505.6	1.2
1121	Wine of fresh grapes, including grape must	30.0		69.8	24.6	0.9
1122	Cider & fermented beverages, nes	30.0			21.6	0.0
1123	Beer, including ale, stout, porter	30.0				1.5
1124	Distilled alcoholic beverages	35.0				0.3
1221	Cigars & cheroots		20.0			0.0
1222	Cigarettes	30.0	20.0	79.6	44.5	0.5
1223	Tobacco, manufactured for smoking, chewing, snuff	30.0			31.3	0.0
2631	Raw cotton, other than linters				12.5	1.6
2927	Cut flowers & foliage	10.0			19.6	0.0
4311	Anim./vege. oils, boiled, oxidized, dehydrated			15.0		0.0
4312	Hydrogenated oils & fats		19.6			0.0
6514	Cotton yarn & thread, bleached, dyed, mercerd.				13.5	0.0
	Subtotal					13.2
	Other					9.4
	Total					22.6

Source: Authors' calculation based on UN Comtrade data.

Mauritius imposes high tariffs on various industries—cigarettes (79.6 percent), refined sugar (78 percent), wine (69.8 percent), honey (64.1 percent), chocolate and other food preparations of cocoa (51.5 percent), and bakery products (40.1 percent). Protection in the DRC also extends across several industries, though tariffs are all between 10 and 20 percent. Angola protects beverages and tobacco with tariffs of 30 percent in most industries, while tariffs applied to other industries, such as meat and cereal preparations, are low (10 percent).

Welfare Impact of an FTA at the Industry Level

As discussed previously, the overall effect of an FTA on agriculture will result in positive welfare gains for the region as a whole and in particular for low-income countries. In this section, we focus on low-income countries and the impact of different industries on the total welfare effects at the country level. We divide the effects on welfare gains into two main components:

- gains for importers as a result of reduced industry protection
- gains for exporters to markets with reduced protection

We look first at the gains for importers as the result of reduced protection in different markets (Table 19).

Results in Table 19 show that except for Zimbabwe, elimination of tariffs in a regional FTA results in negative welfare impacts for importers in all countries, though the absolute values of these losses are small. This means that in industries facing reduced protection, trade diversion dominates trade creation in agriculture when low-income countries open their agricultural markets to the region. This is because the loss in tariff revenue that results from exports from the region is not compensated by the new trade created within the region. As discussed in Section 4, trade diversion in the importing country is a result of the importer shifting from an efficient exporter to an inefficient one as a consequence of the FTA. In almost all industries and countries, the welfare effect of an FTA is negative, which is evidence of the importance of inefficient regional exporters. Thus, even though production in several agricultural industries in countries with relatively high tariffs would reduce as a result of an FTA, the producer's welfare losses would not be compensated by the consumer's welfare gains. This means that in low-income importing SADC countries, there is no direct gain to opening their agricultural markets to regional imports.

A different picture arises when we look at welfare results for countries exporting to markets with reduced protection as a consequence of an FTA in SADC. As discussed in Section 4, producers in these exporting countries do not benefit from trade, because the price they receive is the same as the one they received before the FTA. However, if the exporter is inefficient with respect to the rest of the world, consumers in exporting countries benefit from the fact that these countries need to import from the rest of the world to compensate for the supply that is now being directed to importing countries in the region. Because the exporting country has a tariff on imports from the rest of the world, imports generate additional tariff revenue, which benefits consumers. This means that the same inefficiency of exporters that results in negative welfare effects for regional importers is the factor explaining welfare gains in exporting countries, with these benefits going to consumers. If the exporter is efficient (no tariffs imposed), then there is no welfare effect (positive or negative) for the exporting country as a result of the FTA. Table 20 summarizes welfare results for countries exporting to markets with reduced protection in the region.

The positive welfare effects for low-income exporters in SADC shown in Table 20 are 10 times bigger than the negative effects of opening their markets to agricultural trade as importers. Gains result from exports of cotton, beer, maize, rice, oilseed cakes, and tea. Exports from industries such as meat of swine, cigarettes, leather of other bovine animal, malt, meal and flour of wheat, refined sugar and other products, bakery products, manufactured tobacco, and margarine also contribute to significant welfare gains. Zimbabwe receives almost half the total welfare gains of low-income countries. The other half is shared by Tanzania, Malawi, and Mozambique.

Table 19. Low-income countries: Welfare gains of countries importing products of industries facing reduced protection as a result of eliminating tariffs between SADC countries (in thousands of US$)

SITC	Industry	Madagascar	Malawi	Mozambique	Tanzania	Zambia	Zimbabwe	Total	Share (%)
4312	Hydrogenated oils & fats	0	65	0	0	114	186	364	–3.9
0470	Meal & flour of cereals, exc. wheat or meslin	0	–66	0	0	0	281	216	–2.3
0440	Maize (corn), unmilled	0	0	0	0	–394	531	137	–1.5
0814	Meat & fish meal, unfit for human consumption	0	0	8	0	11	93	112	–1.2
0482	Malt, including malt flour	0	4	0	68	15	0	88	–0.9
1123	Beer, including ale, stout, porter	0	0	–69	0	0	0	–69	0.7
0459	Cereals, unmilled, nes	0	–11	–3	0	–49	–14	–76	0.8
0541	Potatoes, fresh, not including sweet potatoes	0	0	0	0	–33	–58	–91	1.0
0545	Other fresh vegetables	0	0	–100	0	7	0	–94	1.0
0752	Spices, exc. pepper & pimento, ground or not	85	0	–99	0	–93	0	–106	1.1
0460	Meal & flour of wheat or meslin	–364	0	209	0	0	0	–155	1.7
0620	Sugar confectionery & other sugar preparations	0	–175	0	0	0	0	–175	1.9
0914	Margarine, imitn. lard & preprd. edible fats, nes	–152	–22	47	46	–140	0	–222	2.4
0484	Bakery products	0	0	–452	0	0	0	–452	4.9
4313	Acid oils, fatty acids & solid residues	0	–59	0	–412	0	0	–471	5.1
0542	Beans, peas, lentils & leguminous veg., dried	0	–25	–73	0	–226	–239	–563	6.1
0488	Preparations of cereals, flour & starch for food	0	–238	0	–386	0	0	–623	6.7
0422	Rice, glazed or polished, not further prepared	0	0	–1,943	1,121	0	0	–822	8.8
0481	Cereal grains, flaked, pearled	0	–144	–250	0	–212	–321	–927	10.0
0611	Raw sugar, beet & cane	–327	0	–588	–107	0	0	–1,021	11.0
1121	Wine of fresh grapes, including grape must	0	0	–1,093	0	0	0	–1,093	11.8
0612	Refined sugar & other prod. of refining, no syrup	0	0	0	–3,332	0	0	–3,332	35.8
	Other	2	2	–23	4	40	47	73	–0.8
	Total	–756	–668	–4,428	–2,995	–961	506	–9,302	100.0

Source: Authors' calculation based on UN Comtrade data.

Table 20. Low-income countries: Welfare gains of countries exporting products of industries facing reduced protection in importing countries as a result of eliminating tariffs between SADC countries (in thousands of US$)

SITC	Industry	Madagascar	Malawi	Mozambique	Tanzania	Zambia	Zimbabwe	Total	Share %
2631	Raw cotton, other than linters	0	61	409	7,380	223	5,206	13,280	13.7
1123	Beer, including ale, stout, porter	0	0	0	0	0	12,462	12,462	12.9
0440	Maize (corn), unmilled	0	992	7,618	773	410	0	9,794	10.1
0422	Rice, glazed or polished, not further prepared	0	9,427	0	0	0	0	9,427	9.7
0813	Oilseed cake & meal & other veg. oil residues	1,953	382	354	1,697	0	4,680	9,066	9.4
0741	Tea	0	3,782	0	2,432	0	2,023	8,237	8.5
0113	Meat of swine, fresh, chilled, or frozen	0	0	3,741	0	0	98	3,839	4.0
1222	Cigarettes	0	0	0	906	0	2,842	3,748	3.9
6114	Leather of other bovine cattle & equine leather	0	0	0	0	0	3,638	3,638	3.8
0482	Malt, including malt flour	0	0	0	0	0	2,677	2,677	2.8
0460	Meal and flour of wheat or meslin	0	0	0	1,340	740	142	2,221	2.3
0612	Refined sugar & other prod. of refining, no syrup	1,572	163	0	0	0	307	2,043	2.1
0484	Bakery products	0	0	0	0	0	1,866	1,866	1.9
1223	Tobacco, manufactured for smoking, chewing, snuff	0	32	0	0	0	1,748	1,780	1.8
0914	Margarine, imitn. lard & preprd. edible fats, nes	0	0	0	0	0	1,711	1,711	1.8
0611	Raw sugar, beet & cane	0	760	0	0	0	951	1,711	1.8
0542	Beans, peas, lentils & leguminous vege., dried	291	0	0	984	0	0	1,275	1.3
0488	Preparations of cereals, flour & starch for food	0	0	0	0	0	822	822	0.8
0545	Other fresh vegetables	0	0	0	153	0	523	676	0.7
0470	Meal & flour of cereals, exc. wheat or meslin	0	0	0	674	0	0	674	0.7
2929	Materials of vegetable origin, nes	413	0	0	235	0	0	648	0.7
6113	Calf leather	0	0	0	0	523	32	555	0.6
0620	Sugar confectionery & other sugar preparations	0	0	0	0	0	507	507	0.5
	Other	963	582	13	1,463	182	928	4,129	4.3
	Total	5,191	16,182	12,135	18,036	2,078	43,162	96,784	100.0

Source: Authors' calculation based on UN Comtrade data.

Table 21 presents total net welfare gains for low-income countries. This table was obtained by adding welfare results for each industry and country from Tables 19 and 20. Zimbabwe, as a relatively inefficient exporter of agricultural products to the region, obtains the largest welfare gain among low-income countries through its exports of beer, cotton, oilseed cakes, leather, cigarettes, and malt, among others. Malawi and Tanzania follow Zimbabwe, with Malawi benefiting mainly from regional exports of rice and tea and Tanzania from exports of tea, oilseed cake, and meal and flour of wheat. Major benefits in other countries come from exports of maize and meat of swine (Mozambique), refined sugar (Madagascar), and meal and flour of wheat (Zambia).

Finally, Table 22 shows net welfare gains for other countries (Angola, the DRC, Mauritius, SACU). Similar to Zimbabwe, SACU benefits from protection from the rest of the world and from its comparative advantage as an agricultural producer in the region. Meal and flour of cereals, wine, beer, and maize explain most of the welfare gains of SACU countries. Mauritius, a country with comparative disadvantage in agriculture with respect to global markets, is able to benefit from a regional FTA with exports of manufactured products from industries like beer and meal and flour of wheat. Angola and the DRC, which have the highest comparative disadvantage for agriculture in the region, lose from the agreement, because they import products from protected industries such as wine, beer, meal and flour of wheat, preparation of cereals, sugar, and bakery products.

We conclude that given the pre-FTA level of protection in agriculture, inefficient agricultural producers with a regional comparative advantage for agriculture will benefit the most from the agreement. Exports from these countries generate trade diversion in importing markets that, in most cases, cannot be compensated for by trade creation from eliminating tariffs. Countries with regional comparative disadvantage for agriculture, such as Angola and the DRC, cannot compensate with their own exports for the negative effects of opening their markets to inefficient exporters; therefore, the impact of an FTA on welfare is negative. The decision of these countries not to participate in an FTA in SADC is justified by these results, at least in the case of agriculture. These results highlight the importance of reducing tariffs that regional exporters impose on the rest of the world in order to reduce trade diversion and increase benefits for consumers in countries that face output contraction as a consequence of the agreement. The results also draw attention to the planned customs union for SADC and how the determination of the common tariffs could affect the outcome of this agreement in terms of agriculture’s efficiency and the welfare of different countries.

Table 21. Low-income countries: Net welfare gains[1] of an FTA in industries facing reduced protection as a result of eliminating tariffs between SADC countries (in thousands of US$)

SITC	Industry	Madagascar	Malawi	Mozambique	Tanzania	Zambia	Zimbabwe	Total	Share (%)
2631	Raw cotton, other than linters	0	61	409	7,380	246	5,206	13,303	15.2
1123	Beer, including ale, stout, porter	0	0	–69	0	0	12,462	12,394	14.2
0440	Maize (corn), unmilled	0	992	7,618	773	16	531	9,931	11.4
0813	Oilseed cake & meal & other veg. oil residues	1,953	382	354	1,697	0	4,680	9,066	10.4
0422	Rice, glazed or polished, not further prepared	0	9,427	–1,943	1,121	0	0	8,605	9.8
0741	Tea	0	3,782	0	2,432	46	2,023	8,283	9.5
0113	Meat of swine, fresh, chilled, or frozen	0	0	3,741	0	0	98	3,839	4.4
1222	Cigarettes	0	0	0	906	0	2,842	3,748	4.3
6114	Leather of other bovine cattle & equine leather	0	0	0	0	0	3,638	3,638	4.2
0482	Malt, including malt flour	0	4	0	68	15	2,677	2,765	3.2
0460	Meal & flour of wheat or meslin	–364	0	209	1,340	740	142	2,066	2.4
1223	Tobacco, manufactured for smoking, chewing, snuff	0	32	28	0	0	1,748	1,808	2.1
0914	Margarine, imitn. lard & preprd. edible fats, nes	–152	–22	47	46	–140	1,711	1,489	1.7
0484	Bakery products	0	0	–452	0	0	1,866	1,414	1.6
0470	Meal & flour of cereals, exc. wheat or meslin	0	–66	0	674	0	281	889	1.0
0481	Cereal grains, flaked, pearled	0	–144	–250	100	–212	–321	–827	–0.9
1121	Wine of fresh grapes, including grape must	0	0	–1,093	0	0	0	–1,093	–1.2
0612	Refined sugar & other prod.of refining, no syrup	1,572	163	0	–3,332	0	307	–1,289	–1.5
0752	Spices, exc. pepper & pimento, ground or not	412	0	–99	107	–93	0	327	0.4
4313	Acid oils, fatty acids & solid residues	188	–59	0	–412	0	0	–283	–0.3
2929	Materials of vegetable origin, nes	413	0	0	235	0	0	648	0.7
	Other	415	961	–795	1905	500	3777	6762	7.7
	Total	4,436	15,514	7,706	15,041	1,117	43,668	87,482	100.0

Note: 1. Calculated as the sum of welfare gains of each country as an importer and an exporter of each industry from tables 19 and 20.

Source: Authors' calculation based on UN Comtrade data.

Table 22. Other countries: Net welfare gains in industries facing reduced protection as a result of eliminating tariffs between SADC countries (in thousands of US$)

SITC	Industries	Angola	DRC	Mauritius	SACU	Total	Share (%)
0470	Meal & flour of cereals, exc. wheat or meslin	–304	–193	0	11,341	10,845	26.2
1123	Beer, including ale, stout, porter	–1,397	0	7,260	4,955	10,818	26.1
0460	Meal and flour of wheat or meslin	–1,106	–660	9,261	–6	7,490	18.1
0611	Raw sugar, beet & cane	0	–406	4,881	101	4,576	11.0
0440	Maize (corn), unmilled	0	0	0	4,298	4,298	10.4
0483	Macaroni, spaghetti, noodles, vermicelli, etc.	0	0	739	1,374	2,113	5.1
4312	Hydrogenated oils & fats	0	27	0	2,081	2,107	5.1
0741	Tea	0	138	0	1,395	1,532	3.7
2631	Raw cotton, other than linters	0	0	0	1,082	1,082	2.6
0813	Oilseed cake & meal & other veg. oil residues	0	0	0	885	885	2.1
0481	Cereal grains, flaked, pearled	0	0	–320	1,048	727	1.8
0730	Chocolate & other food prep. of cocoa	0	–224	–385	1,227	617	1.5
4313	Acid oils, fatty acids & solid residues	0	0	525	0	525	1.3
0459	Cereals, unmilled, nes	0	0	0	503	503	1.2
0814	Meat & fish meal, unfit for human consumption	0	0	0	502	502	1.2
0541	Potatoes, fresh, not including sweet potatoes	–228	0	0	702	474	1.1
1223	Tobacco, manuf. for smoking, chewing, snuff	450	0	0	5	454	1.1
0620	Sugar confectionery & other sugar preparations	0	–486	0	58	–428	–1.0
0545	Other fresh vegetables	0	–107	–353	–27	–487	–1.2
0422	Rice, glazed or polished, not further prepared	0	0	–974	318	–656	–1.6
0542	Beans, peas, lentils & leguminous veg., dried	–686	–107	0	0	–793	–1.9
0488	Preparations of cereals, flour & starch for food	3	–979	0	0	–977	–2.4
0612	Refined sugar & other prod. of refining, no syrup	0	–346	–675	–137	–1,158	–2.8
0484	Bakery products	0	–445	–1,029	77	–1,397	–3.4
1121	Wine of fresh grapes, including grape must	–8,493	0	–1,615	5,187	–4,920	–11.9
	Other	–1,324	294	–1,106	4,820	2,684	6.5
	Total	–13,085	–3,494	16,208	41,787	41,417	100.0

Source: Authors' calculation based on UN Comtrade data.

6. CONCLUSIONS AND POLICY IMPLICATIONS

In this study, we assess the potential welfare impacts of an FTA on the agricultural sector of southern African countries and determine opportunities and challenges faced by the region as a consequence of the agreement. We first analyze the characteristics of the current agricultural trade of SADC countries and identify the 10 leading agricultural industries with the largest export or import values for each SADC country between 2000 and 2005. With a few exceptions, agricultural exports are concentrated in a small group of industries, whereas imports are more diversified. There are ten countries for which the top 10 industries represent more than or close to 90 percent of total agricultural exports. In contrast, there are only two countries for which the top 10 industries represent 80 percent of their agricultural imports. In addition, preliminary evidence exists of structural change in both exports and imports, though the import structure seems to be more dynamic than the export structure.

Looking at the list of top 10 exporting agricultural industries for the 14 SADC countries, we find 92 different agricultural export industries. The 10 major export industries in the region are tobacco; fish, fresh, chilled, or frozen; raw sugar, beet & cane; wine of fresh grapes and grape juice; crustacean and mollusks, fresh, chilled; oranges, tangerines, and clementines; grapes; fresh fruit; wood, simply shaped or worked; and raw cotton. These industries account, on average, for US$5.5 billion in exports annually and for 51 percent of total SADC agricultural exports (2000–2005).

Although imports are relatively diverse across SADC countries, the total number of different top 10 import industries is 71, which is smaller than the number of top 10 export industries (92). The 10 major import industries in the region are rice, wheat, food preparations, maize, palm oil, poultry, soya bean oil, cotton yarn and thread, distilled alcoholic beverages, and meal and flour of wheat. The annual value of imports of these 10 industries in 2000–2005 was US$2 billion, which is equivalent to 32 percent of total agricultural imports. Almost all SADC countries (12 of 14) are major importers of cereals (rice, wheat, and maize), which account for 14 percent of SADC's total agricultural imports.

We also analyze the characteristics of markets that are the final destination of agricultural exports from SADC countries. As in the case of export industries, export markets are very concentrated. The top 10 import partners absorbed more than 90 percent of SADC agricultural exports from the region as whole, as well as exports from most individual countries. Moreover, we find that market concentration is related to the low diversification of exports. Countries with more diversified exports (e.g., Zambia) also have more diversified import markets. Although the share of intraregional trade has significantly increased in recent years, SADC countries' exports are dominated by extraregional trade. The EU/EFTA is the most important market for SADC exports, accounting for 45.7 percent of the region's agricultural exports. Intraregional trade, with 18 percent of market share, is the second most important destination for SADC exports and is the major source of agricultural imports for the region, accounting for 31 percent of these imports. The EU/EFTA still plays a major role as a source of imports for the region, accounting for 21 percent of SADC's agricultural imports.

Given the main characteristics and structure of agricultural trade in SADC, what are the implications of an FTA in the region? Which agricultural industries in which countries would face challenges? Which countries could benefit from the agreement? To answer these questions, we employ an ex-ante counterfactual analysis of regional trade liberalization in SADC, employing a partial equilibrium approach that uses bilateral trade data at the SITC four-digit level. We found this approach to be best suited to dealing with highly disaggregated trade data, as are used in our study.

Our analysis indicates that although the FTA will have a positive welfare impact for the region as a whole, such benefit is small. We estimate a total value of trade creation of US$157 million, or 0.92 percent of current annual agricultural trade of SADC countries, and a net effect between trade creation and trade diversion of US$129 million, or 0.75 percent of total agricultural trade. The main factors explaining the relatively small impact of an FTA are the relatively small shares of sensitive industries in total trade (less than 30 percent) and the low level of tariffs on agricultural products in most countries (average of 14.5 percent). These two factors are explained, in part, by the policies that SADC countries

followed before the launching of an FTA to reduce regulation and open agricultural markets, with part of the benefits of trade liberalization being realized before an FTA was even in place. In addition, structural characteristics of SADC countries, such as the concentration of agricultural exports among a few commodities and markets and the fact that most SADC countries export a similar group of commodities, seem to be a major constraint to the expansion of regional trade and for opportunities of trade creation under an FTA.

At the country level, two-thirds of regionwide welfare gains from agricultural trade liberalization would go to low-income countries, while almost one-third would go to SACU. The largest share of the gains would go to Zimbabwe, SACU, Malawi, Mauritius, and Tanzania; Angola and the DRC, on the other hand, would be negatively affected by the agreement. We find that countries that benefit the most are those, such as Zimbabwe, that have a comparative advantage for agriculture in the region, while still being inefficient producers of regionally traded commodities. The inefficiency of the main regional exporters also explains the negative welfare impacts of the agreement on countries with comparative disadvantage in the region (net importers), such as Angola and the DRC. This is because the elimination of tariffs on regional imports in these countries would increase imports of wine, beer, meal and flour of wheat, preparation of cereals, sugar, and bakery products from inefficient regional producers, with trade diversion dominating trade creation.

The two main factors explaining the impacts of an FTA agreement on producers and consumers in the different countries are that most of the sensitive industries in SADC (73 out of 85) face reduced protection under an FTA and that the exporting countries are inefficient exporters . In most cases, consumers and producers in importing countries lose due to the trade diversion from regional imports. Producers in exporting countries are not affected, whereas consumers in exporting countries only benefit when production of exporting industries is protected by tariffs on products from the rest of the world. Consumers in these countries are the ones receiving these benefits. These benefits result from increased imports from the rest of the world that compensate for production being exported to the region instead of being consumed domestically. Most benefits to exporting countries come from exports of beer, cotton, oilseed cakes, leather, cigarettes, malt, rice, tea, meal and flour of wheat, and refined sugar. The fact that estimated welfare gains in exporting countries are positive and negative in importing countries shows the importance of regional exports from protected industries in explaining these results.

From a political economy perspective, and based only on our comparative static results, it could be inferred that agricultural producers in the region have no direct incentives to join the FTA, given that no gains are expected for producers in regionally competitive industries, whereas producers in protected domestic industries are threatened by output reductions and welfare losses. On the other hand, impacts on the winners of the FTA—that is, consumers in countries with protected industries that have a comparative advantage for agriculture in the region—appear to be small.

Industries facing output contraction and increased regional imports as a result of the FTA vary by country but are mostly concentrated in cereals, cereal preparations, live animals and meat, and industries incorporating higher value added, such as beverages and tobacco (wine, beer, cigarettes, and manufactured tobacco), spices, fresh and frozen vegetables, raw and refined sugar, animal and vegetable oils, hydrogenated oils and fats, and cotton yarn and thread. In SACU, the industries that would be most affected by a regional trade agreement are nonalcoholic and fermented beverages, dairy (cheese and curd, fresh milk and cream), tobacco industries (cigarettes, manufactured tobacco), bakery products, natural honey, coffee, tea, cocoa, and spices.

Our results are in line with studies discussed in previous sections, showing that gains from an FTA in southern Africa appear to be limited. In particular, Holden (1996) suggested that the southern African region should harmonize and lower external tariffs to minimize chances of trade diversion. Holden also suggested the pursuit of regional cooperation in the areas of uniform customs, harmonized trade procedures, and transportation systems, while pursuing unilateral trade liberalization. Similarly, Lewis (2001) and Lewis, Robinson, and Thierfelder (2002) used CGE models to examine the impact of FTAs on SADC economies. They concluded that there are limitations to the gains that can be achieved

through trade expansion given SADC's small size relative to the global economy and the trade imbalances among its members.

In sum, given policy priorities of accelerating growth, increasing income, reducing poverty, and promoting food security in low-income countries, our results suggest that trade policy in the form of a regional FTA does not appear to be the most effective means to achieve these goals. This is mainly because of the following:

- the concentration of agricultural exports among a small number of agricultural industries, which greatly reduces the possibilities of increasing welfare from trade liberalization (just over half of agricultural industries find trade complementarity in the region, representing only one-third of the total value of exports of SADC countries)
- an FTA could result in a significant amount of trade diversion, opening regional markets to inefficient producers with no benefits for producers in exporting countries, while reducing the welfare of producers in importing countries
- no major gains expected for consumers, who could instead see their welfare negatively affected by increased imports from inefficient regional producers
- the small size of regional import markets, which leaves a very limited scope for enhanced protection for regional producers, which means that an FTA offers little incentives to agricultural producers in the region

These results suggest that the region should be looking at regional policies and interventions beyond trade arrangements, such as those targeting investment, agricultural productivity, and diversification. With growing productivity and enhanced diversification in agricultural production, regional trade liberalization could play a much more significant role in achieving main policy goals.

With respect to the future customs union in SADC, results stress the importance of common external tariffs in agriculture. These tariffs should be determined to complement and reinforce regional policies to promote investment and productivity. Our analysis suggests that high common external tariffs resulting from a compromise to protect inefficient industries in some SADC countries could have negative impacts on consumers and would not benefit producers.

APPENDIX A: LIST OF AGRICULTURAL INDUSTRIES

Table A.1. Agricultural industries included in UN Comtrade

Ind. code	Industry description	Ind. code	Industry description
0011	Bovine cattle including buffaloes	0532	Fruit, fruit peel, preserved by sugar
0012	Sheep, lambs and goats	0533	Jams, marmalades, fruit jellies
0013	Swine	0535	Fruit juices and vegetable juices, unfermented
0014	Poultry, live	0536	Fruit, temporarily preserved
0015	Horses, asses, mules and hinnies	0539	Fruit and nuts, prepared or preserved
0019	Live animals chiefly for food	0541	Potato, fresh, not including sweet potato
0111	Meat of bovine animals, fresh, chilled or frozen	0542	Bean, peas, lentils and leguminous vegetables, dried
0112	Meat of sheep and goats, fresh, chilled or frozen	0544	Tomato, fresh
0113	Meat of swine, fresh, chilled or frozen	0545	Other fresh vegetable
0114	Poultry including offals, liver fresh, chilled, frozen	0546	Vegetables, frozen or in temporary preservative
0115	Meat of horses, and hinnies.	0548	Vegetable products, chiefly for human food
0116	Edible offal of animals, fresh, chilled, frozen	0551	Vegetables, dehydrated.
0118	Other fresh, chilled, frozen meat and edible	0554	Flour and flakes of potato, fruits, vegetables
0121	Bacon, ham and other dried, salted,	0555	Vegetables preserved or prepared,
0129	Meat and edible offal, dried, salted, smoked	0611	Raw sugar, beet and cane
0133	Meat extracts and meat juices	0612	Refined sugar and other products
0134	Sausages, whether or not in airtight containers	0615	Molasses
0138	Other prepared or preserved meat	0616	Natural honey
0221	Milk and cream evaporated or condensed	0619	Sugars and syrups including artificial honey and caramel
0222	Milk and cream in solid form, blocks or powder	0620	Sugar confectionery and other sugar preparations
0223	Milk and cream fresh	0711	Coffee, green or roasted
0230	Butter	0713	Coffee extracts, essences, concentrates
0240	Cheese and curd	0721	Cocoa bean, raw or roasted
0250	Eggs	0722	Cocoa powder, unsweetened
0311	Fish, fresh, chilled or frozen	0723	Cocoa butter and cocoa paste
0312	Fish, salted, dried or smoked	0730	Chocolate and other food preparations of cocoa
0313	Crustaceans and mollusks, fresh, chilled,	0741	Tea
0320	Fish in airtight containers	0742	Mate
0410	Wheat, unmilled	0751	Pepper and pimento, whether or not ground
0421	Milled or unmilled rice, not further prepared	0752	Spices, excluding pepper and pimento, ground or not
0422	Rice, glazed or polished, not further prepared	0811	Hay and fodder, green or dry
0430	Unmilled barley	0812	Bran, pollard, sharps and other by products
0440	Unmilled maize (corn)	0813	Oilseed cake and meal and other vegetable oil residues

Table A.1. Continued

Ind. code	Industry description	Ind. code	Industry description
0451	Unmilled rye	0814	Meat and fish meal
0452	Unmilled oat	0819	Food waste and prepared animal feed,
0459	Unmilled cereals,	0913	Lard and other rendered pig and poultry fat
0460	Meal and flour of wheat	0914	Margarine, lard and prepared edible fats
0470	Meal and flour of cereals except wheat	0990	Food preparations,
0481	Cereal grains, flaked, pearled	1110	Nonalcoholic beverages,
0482	Malt including malt flour	1121	Wine of fresh grapes, including grape
0483	Macaroni, spaghetti, noodles, vermicelli, etc.	1122	Cider and fermented beverages,
0484	Bakery products	1123	Beer including ale, stout, porter
0488	Preparations of cereals, flour and starch for food	1124	Distilled alcoholic beverages
0511	Oranges, tangerines and clementines	1210	Tobacco, unmanufactured and scrap
0512	Other citrus fruit	1221	Cigars and cheroots
0513	Bananas including plantains, fresh	1222	Cigarettes
0514	Apples, fresh	1223	Tobacco, manufactured
0515	Grapes, fresh	2111	Bovine and equine hides excluding calf and kips
0517	Edible nuts, fresh or dried	2112	Calf skins and kips
0519	Fresh fruit	2114	Goat skins and kid skins
0520	Dried fruit, dehydrated artificially	2116	Sheep and lamb skins, with the wool on
2117	Sheep and lamb skins, without wool	2924	Plants, seeds, flowers
2118	Waste and used leather	2925	Seeds, fruit and spores for planting
2119	Hides and skins	2926	Bulbs, tubers, rhizomes and flowering plants
2120	Fur skins, undressed	2927	Cut flowers and foliage
2211	Groundnuts, peanuts green, flour and meal	2929	Materials of vegetable origin
2212	Copra, flour and meal	4111	Oils of fish and marine mammals
2213	Palm nuts and kernels	4113	Animal oils, fats and greases, excluding lard
2214	Soybean	4212	Soybean oil
2215	Linseed	4213	Cotton seed oil
2216	Cotton seed	4214	Groundnut, peanut oil
2217	Castor oil seed	4215	Olive oil
2218	Oil seeds, oil nuts and oil kernels	4216	Sunflower seed oil
2219	Flour and meal of oil seeds, nuts, kernels, fat	4217	Rape, colza and mustard oils
2311	Natural rubber and similar natural gums	4221	Linseed oil
2411	Fuelwood and wood waste	4222	Palm oil
2412	Wood charcoal	4223	Copra oil
2421	Pulpwood, including broad-leaved	4224	Palm kernel oil
2422	Sawlogs and veneer logs (conifer)	4225	Castor oil
2423	Sawlogs and veneer logs (nonconifer)	4229	Fixed vegetable oils
2431	Railway sleepers	4311	Animal, vegetable oils, boiled, oxidized, dehydrated
2432	Lumber, sawn, planed, etc. (conifer)	4312	Hydrogenated oils and fats
2433	Lumber, sawn, planed, etc. (nonconifer)	4313	Acid oils, fatty acids and solid residues
2440	Cork, raw and waste	4314	Waxes of animal or vegetable origin
2611	Silkworm cocoons suitable for reeling	5129	Other organic chemicals

Table A.1. Continued

Ind. code	Industry description	Ind. code	Industry description
2612	Unreelable cocoons and cocoon wastes	5511	Essential oils and resinoids
2613	Raw silk, not thrown	5995	Starches, inulin, gluten, albuminous substances, glues
2621	Wool of sheep and lambs, greasy	6113	Calf leather
2622	Wool of sheep and lamb (wool, degreased)	6114	Leather of other bovine cattle and equines leather
2623	Fine animal hair, wool	6119	Leather
2625	Horsehair and other coarse hair, not carded/combed	6311	Veneer sheets
2626	Wool shoddy	6312	Plywood, including veneered panels
2627	Wool or animal hair, carded	6314	Improved or reconstituted wood
2628	Wool tops	6318	Wood simply shaped or worked
2629	Waste wool and of other animal hair	6511	Thrown silk and silk yarn and thread
2631	Raw cotton, other than linters	6512	Yarn of wool and animal hair
2632	Cotton linters	6513	Cotton yarn and thread, gray, not mercerized
2633	Cotton waste, not carded or combed	6514	Cotton yarn and thread, bleached, dyed, mercerized.
2634	Cotton, carded or combed	6515	Yarn and thread of flax, ramie and true hemp
2640	Jute and waste	6519	Yarn of textile fibers, including paper yarn
2651	Flax and flax tow and waste		
2652	True hemp and true hemp tow and waste		
2653	Ramie and ramie noils and waste		
2654	Sisal and other fibers of the agave family		
2655	Manila fiber and manila tow and waste		
2658	Vegetable textile fiber, and waste		
2711	Natural fertilizers of animal/vegetable origin		
2911	Bones, ivory, horns, hooves, claws and similar prod.		
2919	Materials of animal origin		
2921	Plants used in dyeing and tanning		
2922	Natural gums, resins, balsam and lacs		
2923	Vegetable materials used for plaiting		

Ind. = Industry.

Source: UN Comtrade (2008).

APPENDIX B: METHODOLOGY

B.1. Indexes of Revealed Comparative Advantage and Disadvantage

An RCA index for commodity ***i*** in country k is defined as the ratio of the share of this commodity in total exports from k (x_i^k) to the share of exports of ***i*** in total exports of a reference group of countries (x_i^R):

$$RCA_{ik} = \frac{x_i^k}{x_i^R}$$

Similarly, an RCD index for commodity ***i*** in country k is the ratio of the share of k's imports of this commodity in total imports of k (m_i^k) to the share of imports of ***i*** in total imports of a reference group of countries (m_i^R):

$$RCD_{ik} = \frac{m_i^k}{m_i^R}$$

B.2. Trade Complementarity, Sensitive Industries, and Protection Regimes

Formally, the set of industries showing complementarity in SADC (TCI) is defined as follows:

$$TCI^{AB} = \left\{ i \in \frac{C}{RCA_i^B} > 1 \text{ and } RCD_i^A > 1 \right\} \text{ with } A \neq B$$

where A and B are importing and exporting SADC countries, respectively.

The group of sensitive industries is a subset of the set of industries showing trade complementarity. This is the set of industries that has regional trade complementarity and that is protected by tariffs. We use ad valorem equivalent measures of tariff duties and tariff rate quotas at the six-digit level of the harmonized system (5,111 products) from Bouët et al. (2004) to determine industries in SADC countries protected by tariffs. As in Vaillant and Ons (2003), we consider that an industry ***i*** is sensitive when

- the industry belongs to the group of industries with regional trade complementarity
- Country B in SADC exports products of industry ***i***
- country A in SADC imports products of industry ***i***
- country A's imports of products of industry ***i*** coming from country B face an ad valorem tariff different from zero

Industries are not sensitive if the exporting country faces a zero tariff before the FTA comes into force. Sensitive industries are then defined as follows:

$$SI^{AB} = \left\{ i \in S \in \frac{C}{X_i^B} > 0, \text{and } M_i^A > 0, \quad \text{and } t_i^{AB} > 0 \right\} \text{ with } A \neq B$$

The group of industries facing reduced protection is a subset of the set of sensitive industries, with the following characteristics:

- The industry in country A (importer) is threatened by the FTA. This means that as a consequence of the FTA, domestic production of ***i*** in country A is displaced by imports:

$$THI^{AB} = \left\{ i \in \frac{K}{\square} i \in S \text{ and } X_i^{A-FTA} < X_i^A \right\}$$

- Industry ***i*** does not offer a trade opportunity to exporter B, meaning that production in country B would not be affected by the FTA.

As the set of industries offering trade opportunities to B is defined as

$$OP^{AB} = \left\{ i \in \frac{U}{i} \in S \text{ and } X_i^{B-FTA} > X_i^B \right\}$$

then industries facing reduced protection (RPI) are those for which

$$RPI^{AB} = \left\{ i \in \frac{RP}{i} \in K \text{ and } i \notin U \right\}$$

Industries with enhanced protection on the other hand are those industries ***i*** for which

$$EPI^{AB} = \left\{ i \in \frac{EP}{i} \notin K \text{ and } i \in U \right\}$$

B.3. Trade regimes

Given the previous definitions, industries expected to face reduced protection in importing SADC markets (A) are those for which import demand at exporter's prices is smaller than exporter's supply at the same prices:

$$1 > \frac{P_i^B m_i^A(P_i^B)}{P_i^B X_i^B(P_i^B)}$$

Industries expected to face increased protection as a result of regional trade liberalization are those for which the ratio of import demand at importer's prices and the value of exporter's supply at importers prices is greater than 1:

$$1 < \frac{P_i^A m_i^A(P_i^A)}{P_i^A X_i^B(P_i^A)}$$

Finally, intermediate industries are those in which

$$1 > \frac{P_i^B m_i^A(P_i^B)}{P_i^B X_i^B(P_i^B)} \text{ and } 1 < \frac{P_i^A m_i^A(P_i^A)}{P_i^A X_i^B(P_i^A)}$$

Because of limited information on supply and supply elasticities of industries at this level of disaggregation, we were able to classify sensitive industries into two groups: those industries facing reduced protection and all other industries (enhanced protection and intermediate). We did this by estimating the ratio between import demand of a particular industry ***i*** in SADC importing markets (A) and the aggregate value of supply in the group of SADC countries exporting products from that industry (B), both at exporter's prices. As in Vaillant and Ons (2003), the value of import demand at exporter's prices is calculated using observed values as follows:

$$P_i^B m_i^A(P_i^B) = \frac{P_i^A m_i^A(P_i^A)}{\theta^{AB}}\left(1 + \left(\frac{1}{\theta^{AB}} - 1\right)\varepsilon_i^A\right)$$

where $\theta^{AB} = {P_i^A}/{P_i^B}$ is a measure of relative efficiency between the importer A and the exporter B and ε_i^A is the import elasticity in A.[18]

For those industries for which the value of import demand at exporter's prices was smaller than exports from the region, there was no need to determine supply in exporting countries. For those cases in which the value of imports was bigger than exports, we used data of supply from different sources, depending on the industry. For basic agricultural products, information was collected from the FAOSTAT (Food and Agriculture Organization [FAO] 2008) database. For processed manufactured products, we used production data from similar industries from the Global Trade Analysis Project (GTAP) database

[18] Derived from a simple calculation using import demand elasticity:

$$P_i^B m_i^A(P_i^B) = P_i^A m_i^A(P_i^A) \times \left[{(P_i^A - P_i^B)}/{P_i^A} \right] \times \varepsilon_i^A$$

(Dimaranan 2006). Because of the lack of information on production for some industries, we relied on information on production of similar industries as a proxy for the missing values.[19]

B.4. Import Elasticities

Table B.1 shows estimates of import elasticities accumulated by Broda, Greenfield, and Weinstein (2006). We present elasticities available for three southern African countries and averages for high-income (HI), developing (DV), and poor (PR) countries. One pattern that can be seen is the lower elasticity of imports in more developed countries. There is also great variability within the different groups of countries. Elasticities for Malawi and Madagascar, which are among the poorest countries in the sample, are higher than those in the group of PR countries, whereas elasticities in Mauritius are larger than those in HI countries but lower than the average of DV countries. There is also variability among elasticities of different groups of industries within the groups of countries. This variability demonstratesthe importance of having country-specific estimates. For instance, the import elasticity of beverages, tobacco, and cereals is relatively high in the three groups of countries (HI, DV, and PR) and in Mauritius, but it is low in Madagascar and Malawi. On the other hand, elasticities for food preparations are higher in Madagascar and Malawi than in the groups of DV and PR countries. In the case of import elasticities for fruits and vegetables, Malawi and Madagascar show relatively high elasticities, as is the case in the groups of DV and PR countries.

Because we do not have elasticity estimates for all SADC countries and because of the variations we observed among the elasticities in average groups of countries and elasticity values in Malawi, Madagascar, and Mauritius, we assume that elasticities for other southern African countries are more likely to be closer in value to those estimated for countries in the region. We try to capture what appear to be robust differences between elasticity values of countries with different levels of income by using values for Malawi and Mozambique for low-income countries in the region, while we used Mauritius's elasticities for southern African middle-income countries.

[19] To check how this constraint might have affected the allocation of sensitive industries among industries with reduced protection and among other industries, we estimated the ratio of import demand at export prices and supply at current prices, using exports as a proxy for supply. Allocating industries using exports as a proxy for supply results in 52 of the 85 sensitive industries showing an import/export ratio less than 1 (61 percent of all sensitive industries). Of the 33 industries with import/export ratio greater than one, 16 industries have ratios greater than 2 and tariffs greater than 10 percent. For only 13 of these industries did we use data from similar or more aggregated industries to estimate supply. We conclude that inaccuracies in supply estimates for lack of data should not have a significant effect on our results.

Table B.1. Import elasticities for Madagascar, Malawi, and Mauritius and averages for three groups of countries

HS code	Description	High Income	Developing	Poor	Madagascar	Malawi	Mauritius
010	Live animals	-11.43	-31.61	-10.78	-3.39		-33.55
020	Meat	-10.79	-12.40	-19.97		-6.02	-2.65
030	Fish	-5.39	-17.00	-22.61			-3.52
040	Dairy & eggs	-6.31	-10.21	-12.35	-17.74	-103.03	-7.76
041	Other edible animal products	-2.44	-7.12	-3.74			0.00
050	Products of animal origin	-3.84	-10.00	-13.51			-6.62
051	Other inedible animal products	-5.67	-11.46	-12.73			0.00
060	Live trees & plants	-3.49	-8.83	-2.85			-6.70
070	Vegetables fresh or frozen	-3.74	-10.97	-20.18			-1.78
071	Vegetables preserved	-4.34	-12.16	-32.89	-33.55		-5.80
080	Fruits fresh	-4.54	-19.27	-21.99	-103.03	-103.03	-5.79
081	Fruits preserved	-3.89	-10.93	-9.02			-3.07
090	Coffe, tea & spices	-6.21	-10.21	-7.29	-76.89		-5.11
091	Other spices	-4.80	-20.61	-38.47			-3.14
100	Cereals	-4.30	-10.96	-17.33	-4.45	-2.19	-8.17
110	Milling industry products	-4.29	-5.96	-7.68	-3.24	-3.96	-15.23
120	Oilseeds	-6.39	-9.80	-19.27	-6.70	-2.35	-2.58
121	Miscelaneous grains & plants	-5.24	-9.45	-20.96	0.00		-1.61
130	Natural gums, resins, etc	-6.57	-9.97	-23.71	-3.71		-2.79
140	Vegetable plant materials	-6.09	-19.02	-44.71			0.00
150	Animal fats & vegetable oils	-4.20	-8.56	-4.54	-6.95	-6.61	-4.03
151	Other vegetable oils	-4.00	-15.65	-16.90	-3.16	-125.24	-6.72
152	Waxes & oil residues	-5.93	-9.70	-22.74			-1.75
160	Edible prep. of meat and fish	-5.93	-7.34	-14.43	-2.65	-2.79	-8.58
170	Sugar & sugar confectionary	-5.40	-9.11	-7.00	-2.93	-1.48	-2.41
180	Cocoa & cocoa preparations	-7.37	-12.50	-12.67	-73.22		-5.75
190	Preparations of cereals, flour, starch or milk	-4.64	-13.50	-8.92	-6.28	-3.70	-4.04
200	Preparations of vegetables, fruits & nuts	-6.01	-9.74	-11.03	-5.04	-119.28	-6.45
210	Miscelaneous edible preparations	-4.89	-11.16	-11.50	-93.46	-9.44	-5.04
220	Beverages	-6.29	-6.90	-3.19	-3.08	-1.67	-1.74
230	Animal feed	-4.97	-34.61	-7.66	-25.03	-4.09	-5.19
240	Tobacco & manufactures of tobacco	-11.27	-26.47	-28.20	-2.00	-4.45	-33.55
	Main product groups						
	Livestock & meat	-6.56	-14.26	-13.67	-10.56	-54.53	-7.73
	Fruits & vegetables	-4.13	-13.33	-21.02	-68.29	-103.03	-4.11
	Cereals & milling products	-4.29	-8.46	-12.50	-3.84	-3.07	-11.70
	Other crops	-5.54	-12.55	-22.47	-21.83	-2.35	-3.13
	Oils & fats	-4.71	-11.30	-14.73	-5.06	-65.93	-4.17
	Food preparations	-5.71	-10.56	-10.92	-30.60	-27.33	-5.38
	Beverages & tobacco	-8.78	-16.68	-15.70	-2.54	-3.06	-17.64
	Average	-5.65	-13.22	-15.96	-22.69	-31.21	-6.28

Note: High Income includes Australia, Austria, Canada, Denmark, Finland, France, Germany, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, United Kingdom, United States, Cyprus, Greece, Hong Kong, Iceland, Ireland, and Switzerland. Developing includes Mexico, Argentina, Brazil, Chile, Colombia, Uruguay, Algeria, Ecuador, Egypt, El Salvador, Gabon, Jordan, Morocco, Peru, Thailand, Tunisia, Turkey, and Venezuela,. Poor countries includes Bolivia, Guatemala, Honduras, Indonesia, Nicaragua, Sri Lanka, Central African Rep and Togo

Source: Based on Broda, Greenfield, and Weinstein (2006). Elasticities available at http://faculty.chicagobooth.edu/christian.broda/website/research/unrestricted/TradeElasticities/TradeElasticities.html.

In Table B.2, we calculate welfare results for Mozambique using three different import elasticities to check the possible effect of the choice of elasticities in our results. The "base" elasticities are those used in the study and are the same as those shown in Table 19. The other two results are obtained using the elasticities of the Developing and the Poor groups, respectively, presented in Table B.1. The use of different elasticities does not change the results. In all cases, Mozambique experienced a welfare loss. The results appear to be consistent for the different industries, as in most cases (especially for the most important industries) results with different elasticities show the same sign.

Table B.2. Welfare gains by Mozambique as a result of increasing imports of products from industries facing reduced protection after the elimination of tariffs between SADC countries using different import elasticities

sitc	comm	Base Elasticity	Elasticity Poor	Elasticity Developing
0013	Swine	1	5	16
0014	Poultry,live	0	0	0
0015	Horses,asses,mules and hinnies	0	0	0
0111	Meat of bovine animals,fresh,chilled or frozen	0	0	0
0112	Meat of sheep & goats, fresh, chilled or frozen	0	0	0
0113	Meat of swine,fresh,chilled or frozen	0	0	0
0115	Meat of horses,asses,mules & hinnies,fr.ch.fro.	0	0	0
0116	Edible offals of animals,fresh,chilled,frozen	0	0	0
0118	Other fresh,chilled,frozen meat & edible offals	0	0	0
0121	Bacon,ham & other dried,salted,smoked pig meat	0	0	0
0129	Meat & edible offals,nes. Dried,salted,smoked	0	0	0
0223	Milk & cream fresh	0	0	0
0240	Cheese and curd	0	0	0
0421	Rice in the husk or not,not further prepared	0	0	0
0422	Rice,glazed or polished,not further prepared	-1943	-1657	-1787
0430	Barley,unmilled	0	0	0
0440	Maize (corn),unmilled	0	0	0
0459	Cereals,unmilled,nes	-3	72	38
0460	Meal and flour of wheat or of meslin	209	569	417
0470	Meal & flour of cereals exc.wheat or meslin	0	0	0
0481	Cereal grains,flaked,pearled	-250	-245	-247
0481	Malt including malt flour	0	1	0
0483	Macaroni,spaghetti,noodles,vermicelli etc.	0	0	0
0484	Bakery products	-452	-443	-432
0488	Preparations of cereals,flour & starch for food	0	0	0
0541	Potatoes, fresh, not including sweet potatoes	0	0	0
0542	Beans,peas,lentils & leguminous vegetab.,dried	-73	488	207
0544	Tomatoes, fresh	-38	-15	-26
0545	Other fresh vegetables	-100	60	-20
0546	Vegetables,frozen or in temporary preservative	0	0	0
0548	Vegetable products,chiefly for human food nes	-8	2	-3
0611	Raw sugar,beet & cane	-588	-531	-505
0612	Refined sugar & other prod.of refining,no syrup	0	0	0
0616	Natural honey	0	0	0
0619	Sugars & syrups nes incl.art.honey & caramel	0	0	0
0620	Sugar confectionery & other sugar preparations	0	0	0
0711	Coffee,green or roasted	0	0	0
0722	Cocoa powder,unsweetened	0	0	0

Table B.2. Continued

sitc	comm	Base Elasticity	Elasticity Poor	Elasticity Developing
0730	Chocolate & other food prep. Of cocoa	0	0	0
0741	Tea	0	0	0
0742	Mate	0	0	0
0751	Pepper & pimento,whether or not grond	0	0	0
0752	Spices, exc. Pepper & pimento ground or not	-99	-105	-95
0811	Hay & fodder,green or dry	0	0	0
0812	Bran,pollard,sharps & other by products	0	0	0
0813	Oil seed cake & meal & other veg. Oil residues	0	0	0
0814	Meat & fish meal, unfit for human consumption	8	13	6
0819	Food wastes & prepared animal feed,nes	0	0	0
0914	Margarine, imitn lard & preprd edible fats nes	47	-67	4
1110	Non alcoholic beverages,n.e.s.	0	0	0
1121	Wine of fresh grapes including grape must	-1093	-1093	-1093
1122	Cider & fermented beverages,nes	0	0	0
1123	Beer including ale,stout,porter	-69	12	377
1124	Distilled alcoholic beverages	0	0	0
1221	Cigars & cheroots	0	0	0
1222	Cigarettes	0	0	0
1223	Tobacco,manufactured for smoking,chewing snuff	28	385	360
2114	Goat skins and kid skins	0	0	0
2117	Sheep and lamb skins, without the wool	0	0	0
2119	Hides & skins,nes	0	0	0
2120	Fur skins,undressed	0	0	0
2440	Cork,raw & waste	0	1	0
2613	Raw silk, not thrown	0	0	0
2631	Raw cotton, other than linters	0	0	0
2632	Cotton linters	0	0	0
2633	Cotton waste, not carded or combed	0	0	0
2640	Jute & waste	0	0	0
2654	Sisal and other fibres of the agave family	0	0	0
2711	Natural fertilizers of anim./veget. Origin	0	1	1
2922	Natural gums,resins,balsam and lacs	0	0	0
2924	Plants,seeds,flowers used in perfumery/pharmac.	0	0	0
2925	Seeds,fruit & spores for planting	-6	-6	-6
2926	Bulbs,tubers,rhizomes and flowering plants	0	0	0
2927	Cut flowers & foliage	0	0	0
2929	Materials of vegetable origin,nes	0	0	0
4113	Animal oils, fats and greases, excluding lard	0	-3	2
4311	Anim./veget.oils,boiled,oxidized,dehydrated	0	0	0
4312	Hydrogenated oils and fats	0	0	0
4313	Acid oils,fatty acids and solid residues	0	0	0
4314	Waxes of animal or vegetable origin	0	0	0
6113	Calf leather	0	0	0
6114	Leather of other bovine cattle & equine leather	0	0	0
6511	Thrown silk & silk yarn and thread	0	1	0
6514	Cotton yarn & thread, bleached, dyed, mercerd.	0	0	0
6519	Yarn of textile fibres,nes incl.paper yarn	0	0	0
	Total	-4428	-2555	-2785

APPENDIX C. INDUSTRIES SHOWING ENHANCES PROTECTION IN AN FTA

The last group of industries included in Tables 12 and 13 is those industries that would enhance protection or that would be the intermediate case in which prices in import markets after regional trade liberalization would fall below prices in less-efficient importers but above prices of the most efficient exporters. Exporters to these markets could benefit from higher prices because regional exports would be lower than imports. This result implies that importers would continue to buy from the rest of the world imposing tariffs to third countries, with regional exporters benefiting from higher prices in these markets. Table C.1 presents industries in this group. Exporters can expect to benefit from the trade agreement through enhanced protection in only 9 of 193 agriculture-related industries. Most tariffs in these industries are low, so big gains for exporters of these industries are not expected. Only Zimbabwe, which has no tariff in sugar confectionery, could benefit from a 24 percent tariff in SACU and a 20 percent tariff in other import markets (Malawi).

Table C.1: Industries facing enhanced protection in other countries as a result of eliminating tariffs between SADC countries

STIC code	Industry	Imports			Tariffs		Exports			Exporters
		Total	Share SACU	Share Other	Average SACU	Average Other	Total	Share SACU	Share Other	
0113	Meat of swine, fresh, chilled or frozen	31,523	72.6	27.4	10.9	10.0	2,561	3.1	96.9	MOZ, ZIM , SACU
0116	Edible offals of animals, fresh, chilled, frozen	10,177	0.0	100.0	5.1	11.8	835	100.0	0.0	SACU
0121	Bacon, ham & other dried, salted, smoked pig meat	2,864	1.9	98.1	14.9	17.5	616	39.5	60.5	ZIM, SACU
0129	Meat & edible offals, nes. Dried, salted, smoked	5,202	0.0	100.0	0.0	10.0	62	27.0	73.0	ZIM, SACU
0240	Cheese and curd	6,385	9.4	90.6	94.7	12.5	6,095	95.1	4.9	MAU, SACU
0421	Rice in the husk or not, not further prepared	3,196	0.0	100.0	0.0	10.2	677	27.6	72.4	MWI, TNZ, SACU
0422	Rice, glazed or polished, not further prepared	104,327	0.0	100.0	0.0	12.2	10,448	81.6	18.4	MWI, TNZ, SACU
0430	Barley, unmilled	1,593	0.0	100.0	0.0	13.6	200	0.0	100.0	TNZ, ZIM
0460	Meal and flour of wheat or of meslin	106,013	0.3	99.7	5.1	10.1	20,507	0.1	99.9	MAU, MOZ, TNZ, ZMB, ZIM, SACU
0470	Meal & flour of cereals exc. wheat or meslin	65,945	1.8	98.2	3.0	14.9	35,385	94.4	5.6	TNZ, SACU
0483	Macaroni, spaghetti, noodles, vermicelli etc.	20,364	0.0	100.0	0.0	7.3	2,175	54.0	46.0	MWI, MAU, SACU
0914	Margarine, imitn lard & preprd edible fats nes	28,543	1.0	99.0	10.0	16.9	9,936	68.3	31.7	ZIM, SACU
1123	Beer including ale, stout, porter	79,880	0.8	99.2	4.2	27.5	21,368	71.0	29.0	MAU, ZIM, SACU
4312	Hydrogenated oils and fats	13,350	2.5	97.5	5.2	16.8	6,039	96.6	3.4	TNZ, SACU
4313	Acid oils, fatty acids and solid residues	29,742	77.7	22.3	10.0	9.2	3,050	91.3	8.7	MDA, MWI, MAU
6114	Leather of other bovine cattle & equine leather	58,127	100.0	0.0	8.1	—	15,913	44.6	55.4	ZIM, SACU
	Other	175,380	79.5	20.5	—	—	26,177	17.9	82.1	—
	Total	742,611	33.3	66.7	—	—	162,043	57.2	42.8	—

Note: Import and export values are in thousands of US$

Source: Authors' calculation based on UN Comtrade data.

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